



TRANSPORTATION CABINET

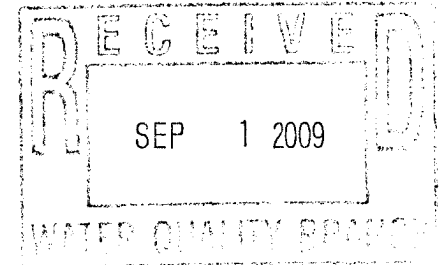
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Joseph W. Prather
Secretary

August 28, 2009

Division of Water
Water Quality Certification Section
Attn: Alan Grant, Supervisor
200 Fair Oaks
Frankfort, Kentucky 40601



SUBJECT: Division of Water Water Quality Certifications
Somerset Northern Bypass, Item No. 8-59.50
Pulaski County, Kentucky

Dear Mr. Grant;

Submitted is an Individual Permit/LOP application for the above referenced project; the construction of a section of the Somerset Northern Bypass. This project concerns the construction of approximately 4.4 miles of new mainline roadway plus a new interchange and several intersection improvements at existing roadways. The impacts include a new bridge over Pitman Creek, several "dry" bridges, where no stream impacts are involved, and the placement of new culvert stream crossings. No wetlands are impacted.

Section 106 of the National Historic Preservation Act has been addressed through consultation with the KY SHPO. This project is federally funded and, as such, the Federal Highway Administration has addressed issues related to the NHPA. Attached for your consideration is a copy of the Memorandum of Agreement, signed by FHWA and the SHPO to mitigate for adverse effects created by the undertaking.

Section 7 of the Endangered Species Act (ESA) has been addressed through consultation with the US Fish and Wildlife Service. This project is federally funded and, as such, the Federal Highway Administration has addressed issues related to the ESA. Attached for your consideration is a copy of the endangered species list for Pulaski County, provided by USFWS, and correspondence from the USFWS that indicates that the project Not Likely To Adversely Affect any federally listed endangered species.

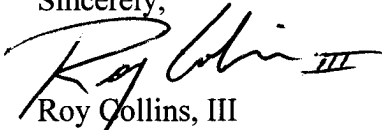
Enclosed is a completed application, summary of impacts, vicinity map, and appropriate drawings for each impact site. Stream assessment and Preliminary JD sheets, and a mitigation discussion with a proposed in lieu fee are also attached.



An Equal Opportunity Employer M/F/D

If you have any questions or need additional information, please contact me at (502) 564-7250.

Sincerely,

A handwritten signature in black ink, appearing to read "Roy Collins, III". The signature is stylized with a large, sweeping initial "R" and a cursive "C".

Roy Collins, III
Permits Coordinator
Division of Environmental Analysis

Enclosures

CC: David Heil, THE _____, D-8 Files

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)		OMB APPROVAL NO. 0710-003 Expires December 31, 2004	
<p>The Public burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.</p>			
PRIVACY ACT STATEMENT			
<p>Authorities: Rivers and Harbors Act., Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act., 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluation the application for a permit. Routine Uses: This Information may be shared with the Department of Justice and other federal, state and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.</p>			
(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)			
1. APPLICATION NO.	2. FIELD OFFICE NO.	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
(ITEMS BELOW TO BE FILLED BY APPLICANT)			
5. APPLICANT'S NAME Kentucky Transportation Cabinet		8. AUTHORIZED AGENT'S NAME AND TITLE <i>(an agent is not required)</i> Dave Harmon, Branch Manager, Division of Environmental Analysis	
6. APPLICANT'S ADDRESS 200 Mero Street, 6 th Floor Frankfort, KY 40622		9. AGENT'S ADDRESS 200 Mero Street, 5 th Floor Frankfort, KY 40622	
7. APPLICANT'S PHONE NOS. W/AREA CODE (502) 564-3130		10. AGENT'S PHONE NOS. W/AREA CODE (502) 564-7250	
11. STATEMENT OF AUTHORIZATION			
<p>I hereby authorize, <u>Roy Collins</u> to act in my behalf as my agent in the processing of this application and to furnish upon request, supplemental information in support of this permit application.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="text-align: center;">  APPLIANT'S SIGNATURE </div> <div style="text-align: center;"> <u>8/28/09</u> DATE </div> </div>			
NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY			
12. PROJECT NAME OR TITLE <i>(see instructions)</i> Construction of a section of Somerset Northern Bypass, Item No. 8-59.50			
13. NAME OF WATERBODY, IF KNOWN <i>(if applicable)</i> Pitman Creek, Dry Branch, and Smiths Branch		14. PROJECT STREET ADDRESS <i>(if applicable)</i> N/A	
15. LOCATION OF PROJECT Pulaski COUNTY KY STATE			
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN <i>(see instructions)</i> This project begins at a new bridge over a railroad and old US 27, near coordinates N37-07-49, W84-37-44. This ties into a previously permitted section. The roadway continues overland on a new alignment for 4.4 miles, ending with a new interchange at KY 39 near coordinates N37-09-26, W84-33-35. (The previously permitted section of roadway, where this project begins, was approved under COE ID No. 200400444).			
17. DIRECTIONS TO THE SITE From the KY 80/US 27 intersection in Somerset, travel north on old US 27 for about 2.7 miles. The project begins at this point with a bridge over old US 27. From this point, the roadway is on a new alignment, heading northeast. It crosses Pitman Creek, near the Smith Branch confluence, and ends with a new intersection at KY 39.			

18. NATURE OF ACTIVITY (Description of project, include all features)

This project concerns the construction of 4.4 miles of the Somerset Northern Bypass, from old US 27 to KY 39. It will involve the construction of bridges over Pitman Creek and several other "dry" bridges over roadways, the placement of several new culverts, and a new interchange at KY 39. This requires impacts to existing streams and ponds. Mitigation will be provided in the form of an in-lieu fee payment.

19. PROJECT PURPOSE (Describe the reason or purpose of the project, see instructions)

NEPA documentation (FONSI) has been previously submitted for prior permit approvals. Briefly stated, the purpose is to alleviate congestion and distribution problems associated with the Louis B. Nunn Parkway/KY 80 route through Somerset. It addresses heavy traffic volumes and local access to facilities and services, as well as to industrial and commercial areas.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. REASON(S) FOR DISCHARGE

To necessitate the roadway construction, impacts to streams and ponds are required. No wetlands are impacted.

21. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS

The material will be "common fill", a combination of native rock and earth. The approximate amount is 537 CY for streams, and 2333 CY for ponds.

22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (see instructions)

A total of 1.181 acres will be filled (streams = 0.666 ac., ponds = 0.515 ac.).

23. IS ANY PORTION OF THE WORK ALREADY COMPLETED? Yes _____ No X* IF YES, DESCRIBE THE COMPLETED WORK

* This project begins at a prior approved section of the Northern Bypass (COE ID No. 200400444)

24. ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY ADJOINS WATERBODY (If more than can be entered here, please attach a supplemental list).

See Attachment

25. LIST OF OTHER CERTIFICATIONS OR APPROVALS/DENIALS RECEIVED FROM OTHER FEDERAL, STATE OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
KY Division Of Water	WQC		Pending		

*Would include but is not restricted to zoning, building and flood plain permits

26. APPLICATION IS HEREBY MADE FOR A PERMIT OR PERMITS TO AUTHORIZE THE WORK DESCRIBED IN THIS APPLICATION. I CERTIFY THAT THE INFORMATION IN THIS APPLICATION IS COMPLETE AND ACCURATE. I FURTHER CERTIFY THAT I POSSESS THE AUTHORITY TO UNDERTAKE THE WORK DESCRIBED HEREIN OR AM ACTING AS THE DULY AUTHORIZED AGENT OF THE APPLICANT.

Paul Z. Herman 8/28/09 Ry White 8/28/09
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

Attachment

Block 24

Adjoining Property Owners

Sharon Beshears
3314 North Hwy. 1247
Somerset, KY 42501

John & Claudette Prather
113 Campground Road
Somerset, KY 42503

Donald Hurt (Kimberly Phillips, et al)
107 Robin Drive
Somerset, KY 42503

Jeffery & Bambie Hubble
129 Hubble Lane
Somerset, KY 42503

James & Corine Moss
101 Linwood Drive
Somerset, KY 42501

Rex & Marilyn Palmer
13614 Kenton Station Rd.
Morningview, KY 41063

Derrick & Sherie Harris
1258 Mark Welborn Rd.
Somerset, KY 42503

Joseph & Edna Crawford
751 Stilesville Road
Science Hill, KY 42553

Harold & Brenda Faulkner
204 Commerce Lane
Somerset, KY 42501

Joe & Lillie Silvers
1206 Stilesville Road
Science Hill, KY 42553

James & Lois Noe
P.O. Box 386
Mt. Vernon, KY 40456

Danny & Christie Stevens
118 Langdon Street
Somerset, KY 42501

Michael & Adiene Wright
218 West Wind Drive
Ball Ground, GA 30107



**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

Vicinity Map

COUNTY: PULASKI

STATE: KENTUCKY

STA 312+65 to STA 545+00

ITEM: 8-59.50

SUMMARY OF IMPACTS
Item No. 8-59.50
(Stations are mainline unless otherwise noted)

1. Left Sta. 341+50 to Right Sta. 348+00 – Construct (upstream to downstream) 23' of inlet channel to a 119.7' culvert (Access Rd #1, Sta. 13+88.53), then 36' of outlet/inlet channel to another 199.4' of culvert (mainline Sta. 345+25.40), then 223' of outlet/inlet channel to a 73' culvert (Campground Rd, Sta. 67+33.8) with 33' of outlet channel. This is on a tributary to Dry Branch, and replaces **30' of existing culvert** and **744' of intermittent** tributary (INT#1). Additionally, relocate **362' of ephemeral** channel (EPH#1) into 349' of roadway drainage channel, which outlets between the first and second culverts above. The total impact to waters is **0.063 acres (0.051 ac. of intermittent, and 0.012 ac. of ephemeral)**. The drainage area affected is **49.9 acres**. The site is located near N37-08-06, W84-37-13. (Individual Permit, Individual WQC)
2. Left Sta. 359+00 – Drain and fill a **0.168 acre pond** (POND#1) in the Dry Branch watershed. The pond is isolated (no connectivity found), and no wetlands were identified. The drainage area affected is **4.9 acres**. The site is located near N37-08-14, W84-37-20. (Non-jurisdictional waters)
3. Right Sta. 399+80 to Sta. 400+60 – Drain and fill a **0.015 acre pond** (POND#2) and **64' of ephemeral** channel (EPH#2); which drain to a sinkhole in the watershed of an unnamed tributary to Pitman Creek. The total impact to waters is **0.016 acres (0.001 ac. of ephemeral and 0.015 ac. of pond)**. The drainage area affected is **4.0 acres**. The site is located near N37-08-32, W84-36-14. (Nationwide Permit No.14)
4. Sta. 410+80 – Fill **312' of an intermittent** tributary (INT#2) to Pitman Creek. Upstream flow will be redirected via 640' of roadside channel to another intermittent tributary. The impact to waters is **0.036 acres**. The drainage area affected is **11.4 acres**. The site is located at N37-08-39, W84-36-06. (Nationwide Permit No. 14)
5. Sta. 414+40 – Construct 453' of pipe culvert, with 32' of inlet and 40' of outlet channel improvements; on a tributary to Pitman Creek. This replaces **588' of intermittent** stream (INT#3-US). The impact to waters is **0.108 acres**. The drainage area affected is **125.3 acres**. The site is located near N37-08-41, W84-36-04. (Individual Permit, Individual WQC)
6. Right Sta. 426+59 (Nelson Valley Rd, Sta. 57+42) – Construct 38.4' of triple box culvert, with 39' of inlet and 197' of outlet channel improvements; on a tributary to Pitman Creek. This replaces **274' of intermittent** stream (INT#3-DS). The impact to waters is **0.025 acres**. The drainage area affected is **139.7 acres**. The site is located near N37-08-42, W84-35-51. (Nationwide Permit No. 14,
7. Sta. 436+75 – Construct two bridges (4-span and 5-span) over Pitman Creek and Smiths Branch; both **perennial streams**. Due to pier construction, and to maintain

flow from Smiths Branch, the right descending streambank area at the Pitman Creek confluence will be removed (the channel widened). Other pier construction will also impact streambanks at several locations. Approximately **152' of the right bank and 207' of the left bank** of Pitman Creek (PER#2) will be disturbed; while **85' of the right bank and 33' of the left bank** of Smiths Branch (PER#1) will be disturbed. The total impact to waters (footprint of piers below OHW and channel widening area) is **0.253 acres**. The drainage area affected is **24.26 sq.miles**. The site is located at N37-08-55, W84-35-40. (Nationwide Permit No. 14)

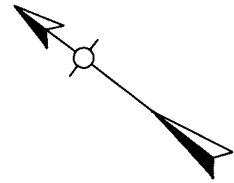
8. Left Sta. 443+20 – Fill **45' of ephemeral** channel (EPH#3). The impact to waters is **0.004 acres**. The drainage area affected is **2.3 acres**. The site is located near N37-08-59, W84-35-36. (Nationwide Permit No. 14)
9. Sta. 454+52 – Construct 306' of pipe culvert, with 13' of inlet and 32' of outlet channel improvement; on a tributary to Pitman Creek. The replaces **393' of intermittent stream** (INT#4). Additionally, relocate **312' of ephemeral** channel (EPH#4) into 330' of roadside drainage channel. The total impact to waters is **0.059 acres (0.045 ac. of intermittent and 0.014 ac. of ephemeral)**. The drainage area affected is **46.4 acres**. The site is located near N37-09-06, W84-35-25. (Nationwide Permit No. 14, Individual WQC)
10. Sta. 474+84 – Construct 192.6' of pipe culvert (Sta. 474+83.9) with 14' of outlet/inlet to another 122.2' culvert (Access Rd #2, Sta. 39+91.7) with 36' of outlet channel; on a tributary to Pitman Creek. This replaces **236' of ephemeral** channel (EPH#5). The impact to waters is **0.005 acres**. The drainage area affected is **8.5 acres**. The site is located near N37-09-16, W84-35-03. (Nationwide Permit No. 14)
11. Right Sta. 482+46 (Stilesville Rd, Sta. 69+00) – Drain and fill a **0.332 acre pond** (POND#3) in the Pitman Creek watershed. The pond is isolated (no connectivity found), and no wetlands were identified. The drainage area affected is **6.2 acres**. The site is located near N37-09-08, W84-34-58. (Non-jurisdictional waters)
12. Right Sta. 518+96 (KY39, Sta. 83+50) – Construct 63' pipe culvert, with 102' of inlet channel improvement; on a channel that connects two sinkhole areas in the Pitman Creek watershed. This replaces **42' of existing culvert and 86' of ephemeral** stream (EPH#7). The impact to waters is **0.006 acres**. Effectively, no drainage area is affected. The site is located near N37-09-13, W84-34-19. (Nationwide Permit No. 14)
13. Sta. 520+96 – Construct 402' of pipe culvert (Sta. 520+95.6), with 204' of outlet/inlet channel to another 119.5' of pipe culvert (KY39 EB Ramp, Sta. 12+75.7) with 95' of outlet channel improvement; on a stream which drains to a sinkhole in the Pitman Creek watershed. This replaces **795' of ephemeral** channel (EPH#6). The impact to waters is **0.091 acres**. The drainage area affected is approximately **250 acres**. The site is located near N37-09-23, W84-34-10. (Nationwide Permit No. 14)

Summary of Impacts Table

Site No.	Reach/Resource No.	STA.	Lat. / Long.	Sheet No.	Impact Category	Stream Type	Watershed (acres)	Impact (ft.)	Impact (acres)	Riffle/Pool Complex	Mitigation Required
1	INT #1 EPH #1	341+50 to 348+00	N37-08-06 W84-37-13	3	Culvert Fill	Intermittent Ephemeral	49.9 "	744 362	0.051 0.012	No No	Yes No
2	POND #1	359+00	N37-08-14 W84-37-20	4	Fill	Open water	4.9	N/A	0.168	N/A	No
3	POND #2 EPH #2	399+80 to 400+60	N37-08-32 W84-36-14	7	Fill	Open water Ephemeral	4.0 "	N/A 64	0.015 0.001	N/A No	No No
4	INT #2	410+80	N37-08-39 W84-36-06	8	Culvert	Intermittent	11.4	312	0.036	No	Yes
5	INT #3US	414+40	N37-08-41 W84-36-04	8	Culvert	Intermittent	125.3	588	0.108	Yes	Yes
6	INT #3DS	426+59 (57+42)	N37-08-42 W84-35-51	8	Culvert	Intermittent	139.7	274	0.025	Yes	Yes
7	PER #1	436+75	N37-08-55 W84-35-40	9	Bridge	Perennial	1182.7	33 LB 85 RB	0.028 0.045	Yes	No
7	PER #2	436+75	N37-08-55 W83-35-40	9	Bridge	Perennial	15526.4	207 LB 152 RB	0.083 0.097	Yes	No
8	EPH #3	443+20	N37-08-59 W84-35-36	10	Fill	Ephemeral	2.3	45	0.004	No	No
9	INT #4 EPH #4	454+52	N37-09-06 W84-35-25	10	Culvert Fill	Intermittent Ephemeral	46.4 "	393 312	0.045 0.014	No No	Yes No
10	EPH #5	474+84	N37-09-16 W84-35-03	12	Culvert	Ephemeral	8.5	236	0.005	No	No
11	POND #3	482+46 (69+00)	N37-09-08 W84-34-58	12A	Fill	Open water	6.0	N/A	0.332	No	No
12	EPH #7	518+96 (83+50)	N37-09-13 W84-34-19	15A	Culvert	Ephemeral	N/A	86	0.006	No	No
13	EPH #6	520+95	N37-09-23 W84-34-10	15	Culvert	Ephemeral	250	795	0.091	No	No

LEGEND

SURVEY
 CONSTRUCTION LIMITS
 PROP R/W
 TEMP ESMT
 EXIST R/W
 EXIST STREAM
 STREAM IMPACT
 TREES/SHRUBS
 DRAINAGE DITCH
 WETLAND



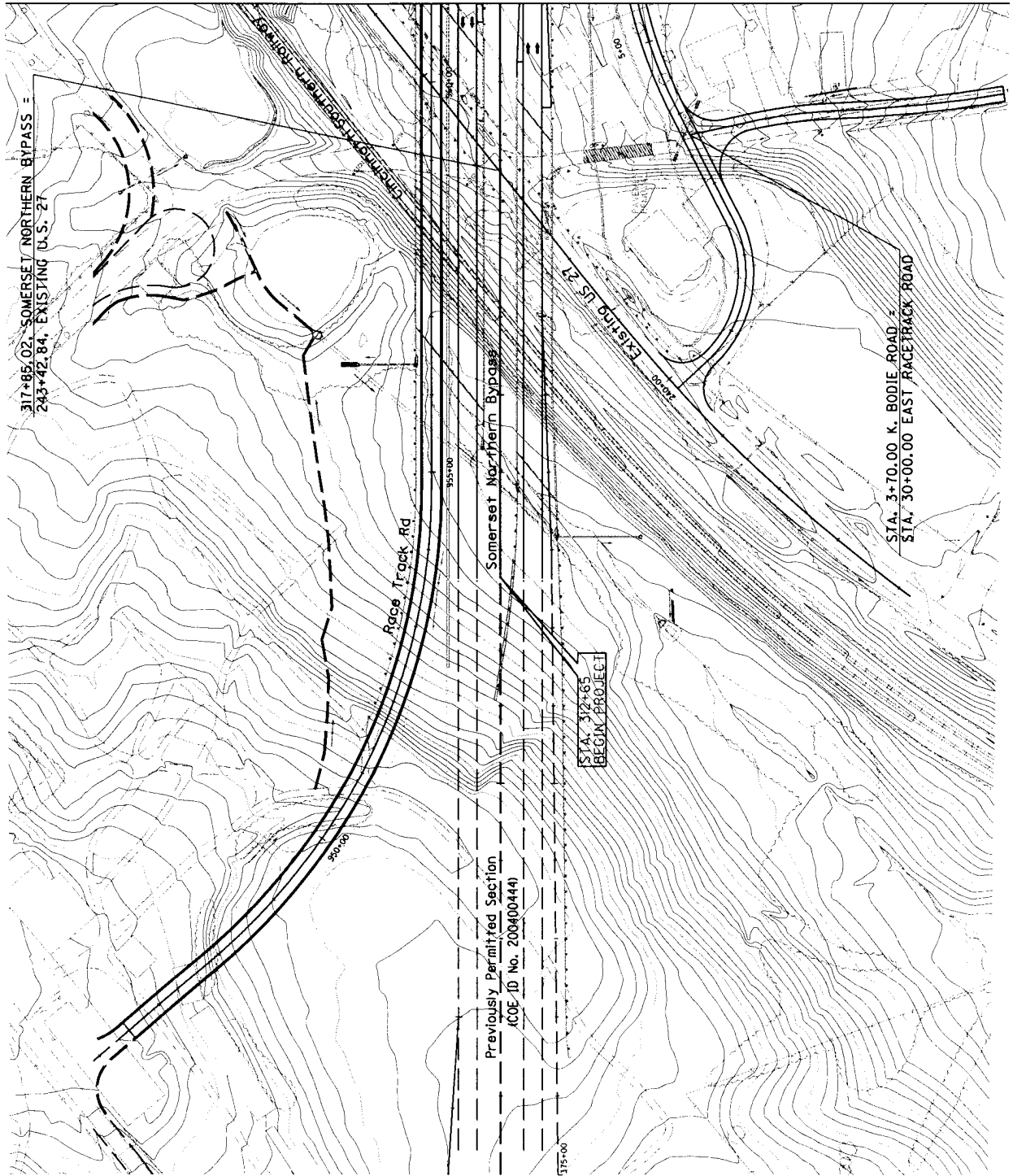
SCALE 1"=200'

320+00

315+00

310+00

305+00



All structures indicated by "dashed" lines are covered under a previous permit

No Impacts This Sheet

Kentucky
Transportation

PROJECT: Somerset Northern Bypass

STREAM: No Impacts

COUNTY: PULASKI

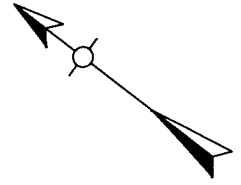
STATE: KENTUCKY

STA 305+00 to STA 320+00

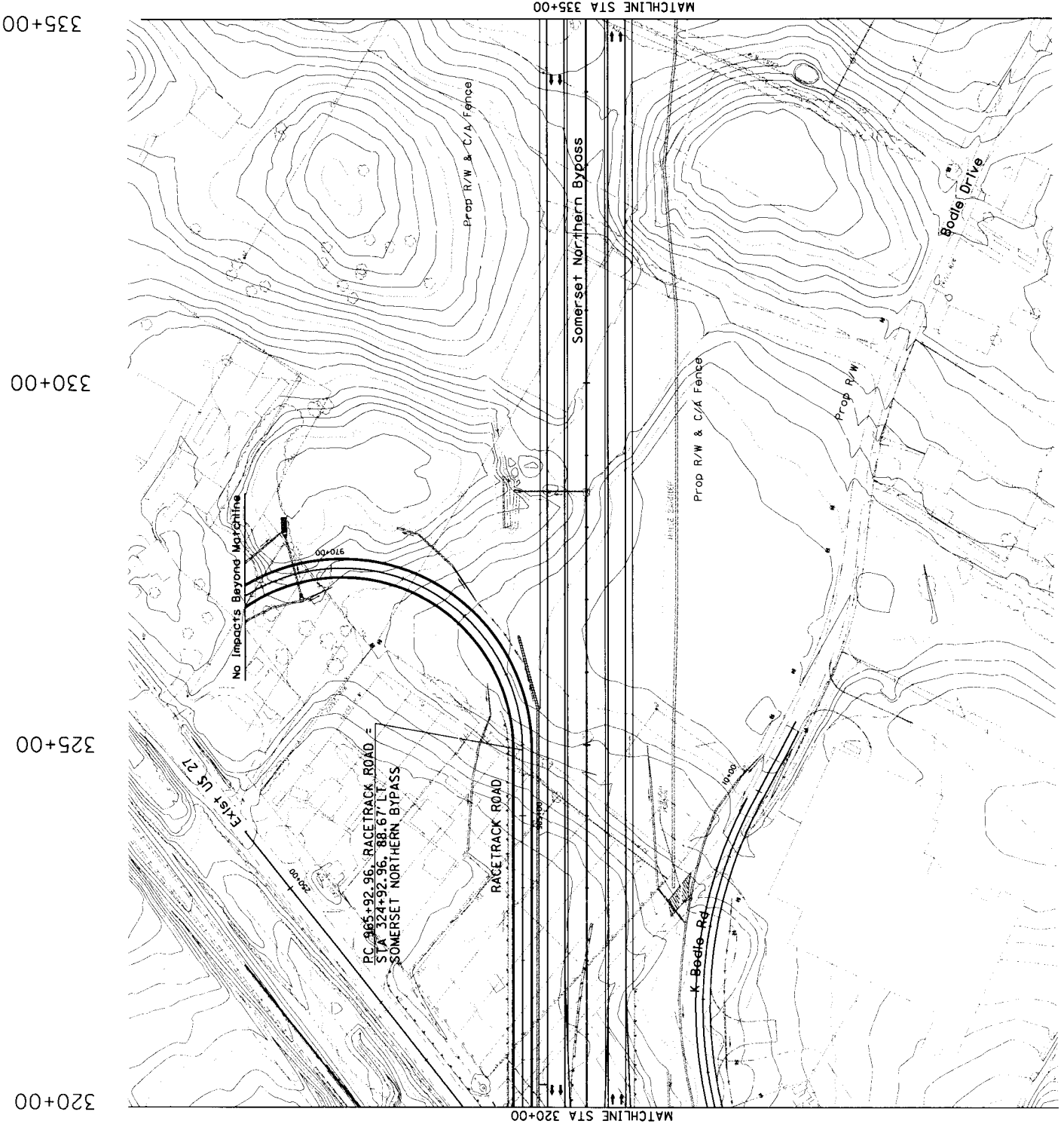
ITEM: 8-59.50

Plan Sheet No. 1

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESM
	EXIST R/W
	EXIST STREAM
	IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



SCALE 1"=200'



No Impacts This Sheet

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impacts

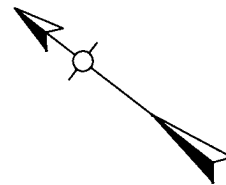
COUNTY: PULASKI

STATE: KENTUCKY

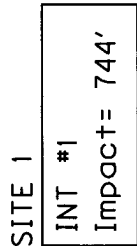
STA 320+00 to STA 335+00

ITEM: 8-59.50

Plan Sheet No. 2



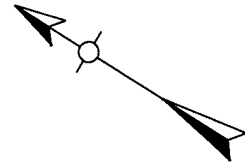
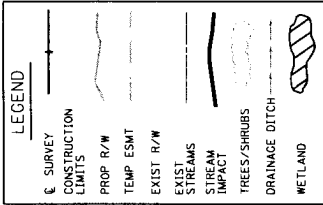
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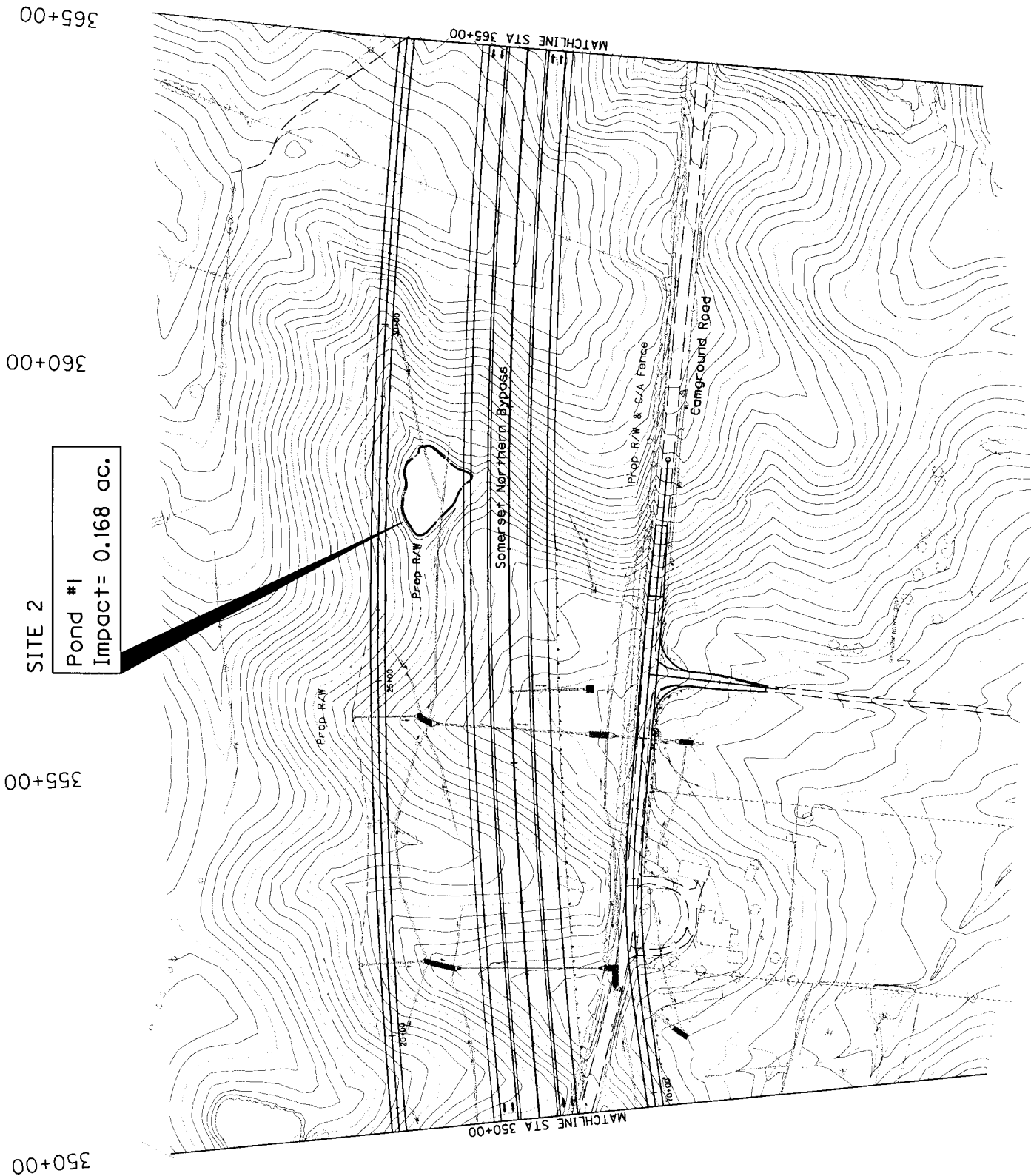
SITE 1

EPH #1
Impact = 362'

Kentucky Transportation	PROJECT: Somerset Northern Bypass			STREAM: UT to Dry Branch	
	COUNTY: PULASKI	STATE: KENTUCKY	STA 335+00 to STA 350+00	ITEM: 8-59.50	Plan Sheet No. 3



SCALE 1"=200'



**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impact

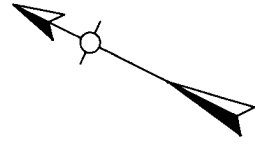
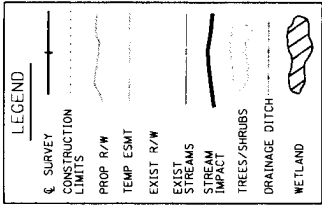
COUNTY: PULASKI

STATE: KENTUCKY

STA 350+00 to STA 365+00

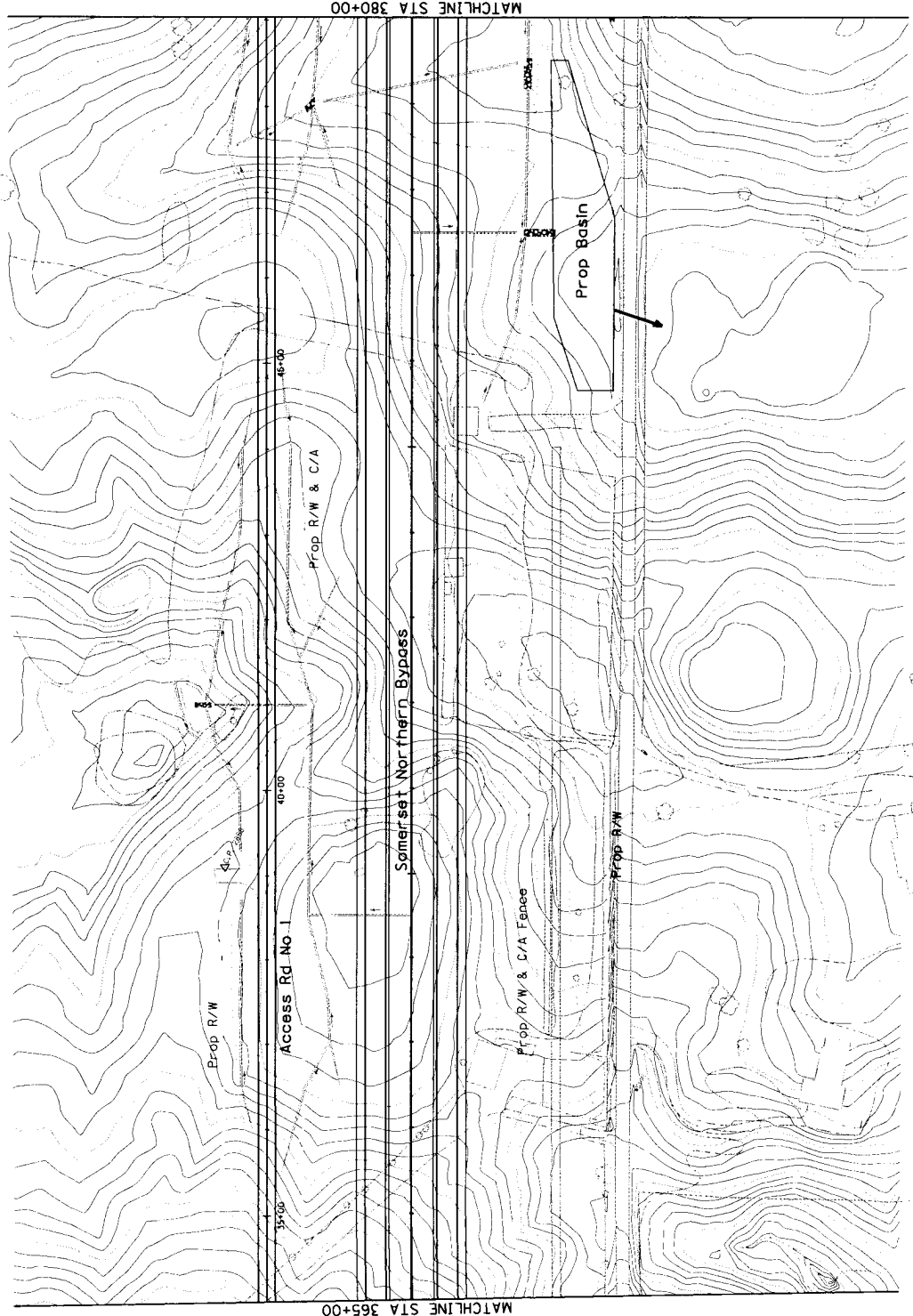
ITEM: 8-59.50

Plan Sheet No. 4



SCALE 1"=200'

365+00 370+00 375+00 380+00



No Impacts This Sheet

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impact

COUNTY: PULASKI

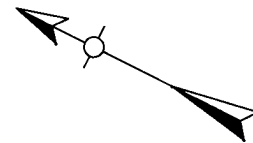
STATE: KENTUCKY

STA 365+00 to STA 380+00

ITEM: 8-59.50

Plan Sheet No. 5

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP. R/W
	TEMP. ESMT
	EXIST. R/W
	STREAM
	IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



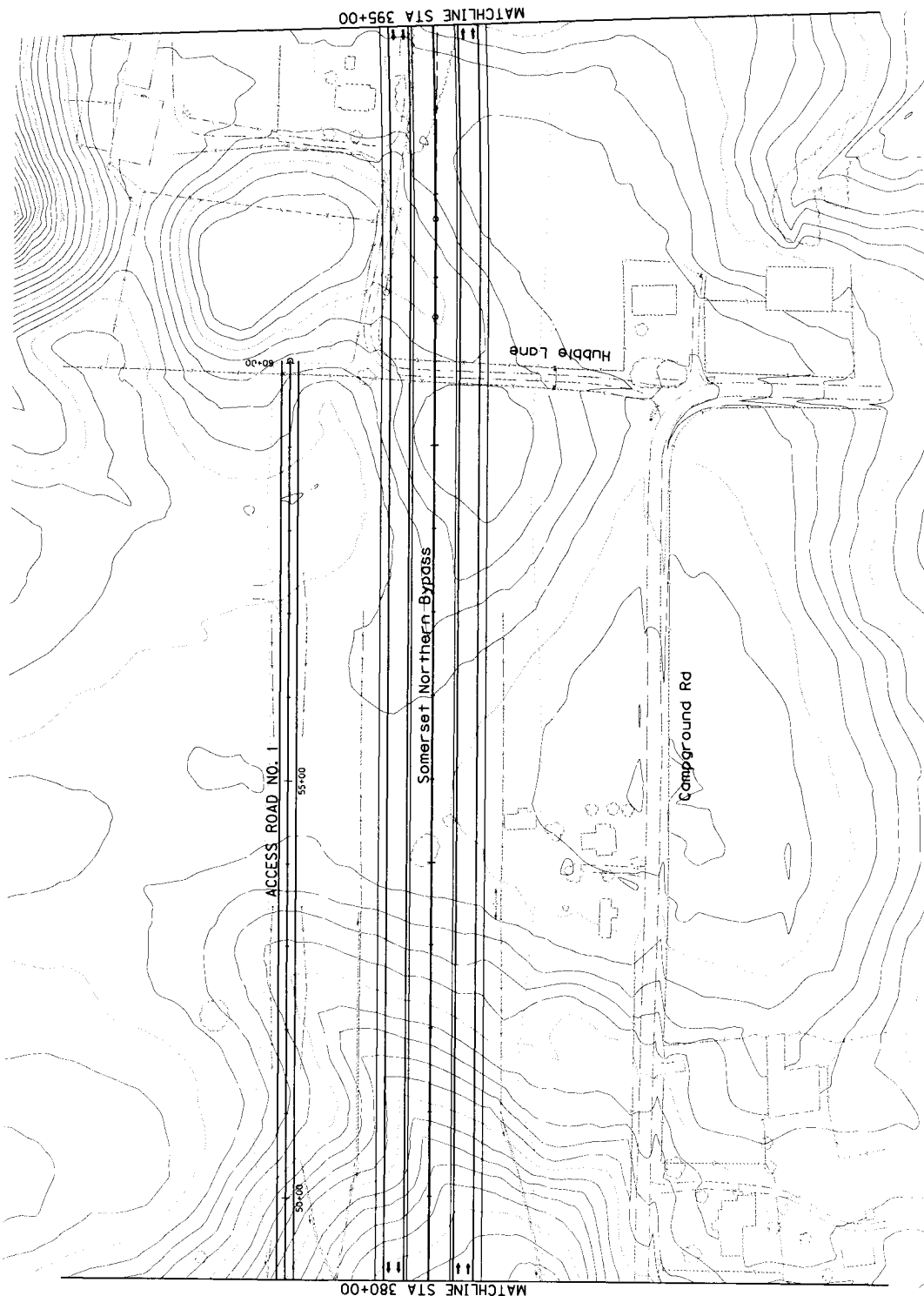
SCALE 1"=200'

395+00

390+00

385+00

380+00



No Impacts This Sheet

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impact

COUNTY: PULASKI

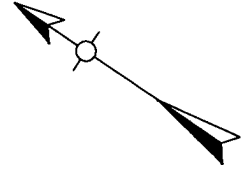
STATE: KENTUCKY

STA 380+00 to STA 395+00

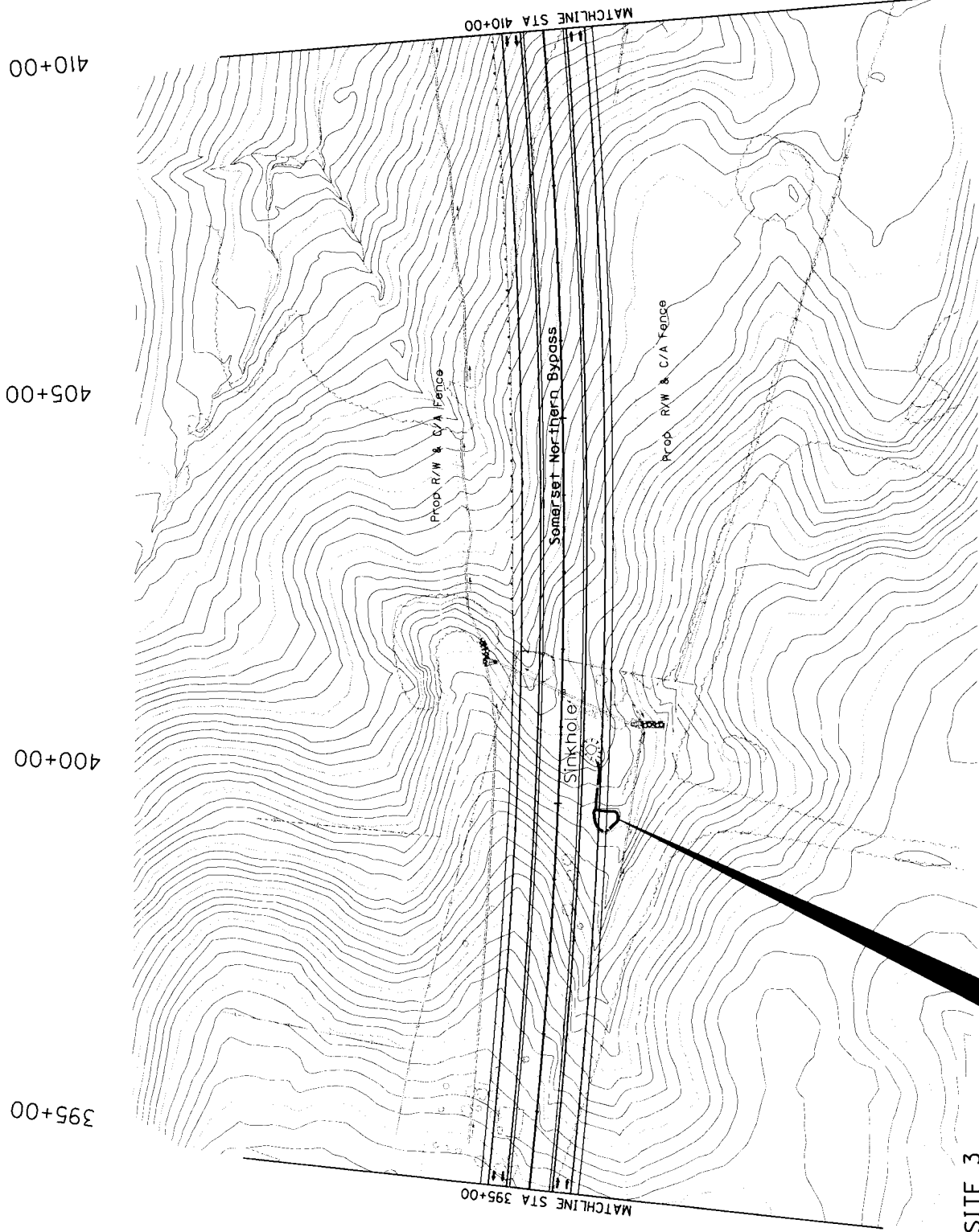
ITEM: 8-59.50

Plan Sheet No. 6

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESMT
	EXIST R/W
	EXIST STREAM
	STREAM IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



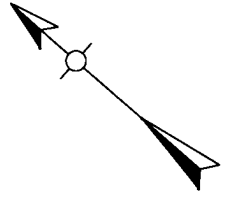
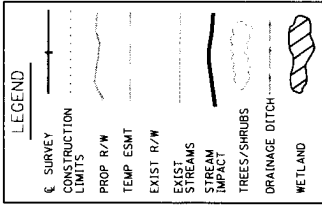
SCALE 1"=200'



SITE 3

Pond #2	Impact= 0.015 ac.
EPH #2	Impact= 64'

Kentucky Transportation	PROJECT: Somerset Northern Bypass			STREAM: Ephemeral channel to sinkhole	
	COUNTY: PULASKI	STATE: KENTUCKY	STA 395+00 to STA 410+00	ITEM: 8-59.50	Plan Sheet No. 7



SCALE 1"=200'

425+00

420+00

SITE 5

INT #3 US
Impact= 588'

415+00

410+00

MATCHLINE STA 425+00

Somerset Northern Bypass

Prop R/W & C/A Fence

Prop R/W & C/A Fence

MATCHLINE STA 410+00

55+00

60+00

Nelson Valley Rd

Nelson Valley Rd

SITE 6

INT #3 DS
Impact= 274'

No Impact Beyond this point

SITE 4

INT #2
Impact= 312'

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: UT's to Pitman Creek

COUNTY: PULASKI

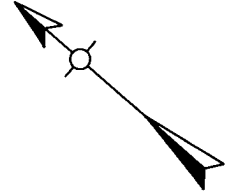
STATE: KENTUCKY

STA 410+00 to STA 425+00

ITEM: 8-59.50

Plan Sheet No. 8

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESMT
	EXIST R/W
	STREAM IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



SCALE 1"=200'

SITE 7

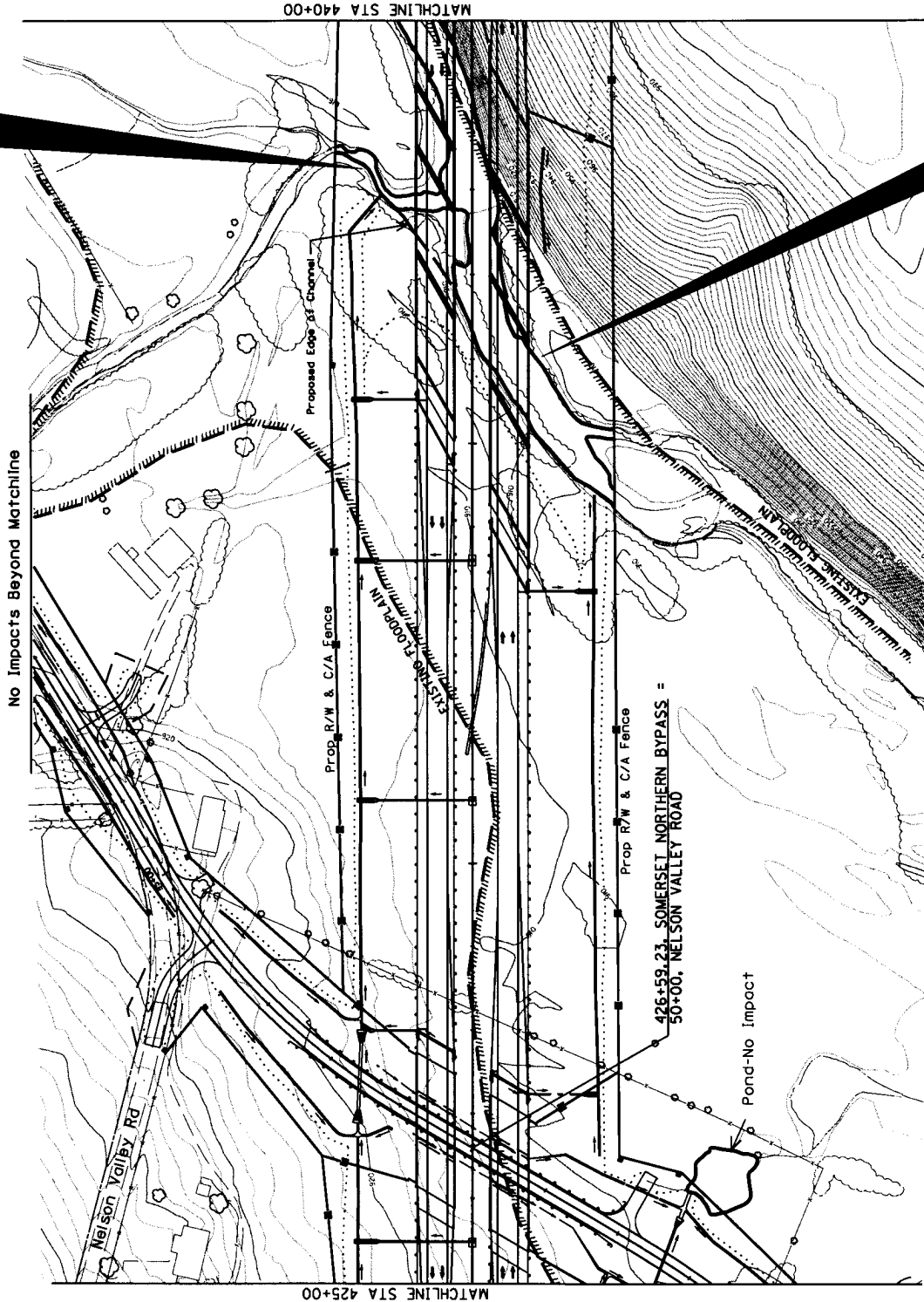
PER #1 (Smiths Br)
Impact:
Left Bank= 33'
Right Bank= 85'

440+00

435+00

430+00

425+00



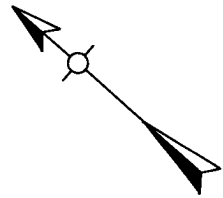
SITE 7

PER #2 (Pitman Ck)
Impact:
Left Bank= 207'
Right Bank= 152'

See Sheet 25 for details
on bridge impacts

LEGEND

SURVEY
 CONSTRUCTION LIMITS
 PROP. R/W
 TEMP. ESMT
 EXIST. R/W
 EXIST. STREAM
 STREAM IMPACT
 TREES/SHRUBS
 DRAINAGE DITCH
 WETLAND



SCALE 1"=200'

440+00

445+00

450+00

455+00

SITE 8

EPH #3
Impacts= 45'

EPH # 4 (continued next sheet)

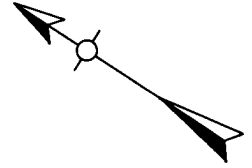
MATCHLINE STA 440+00

MATCHLINE STA 455+00

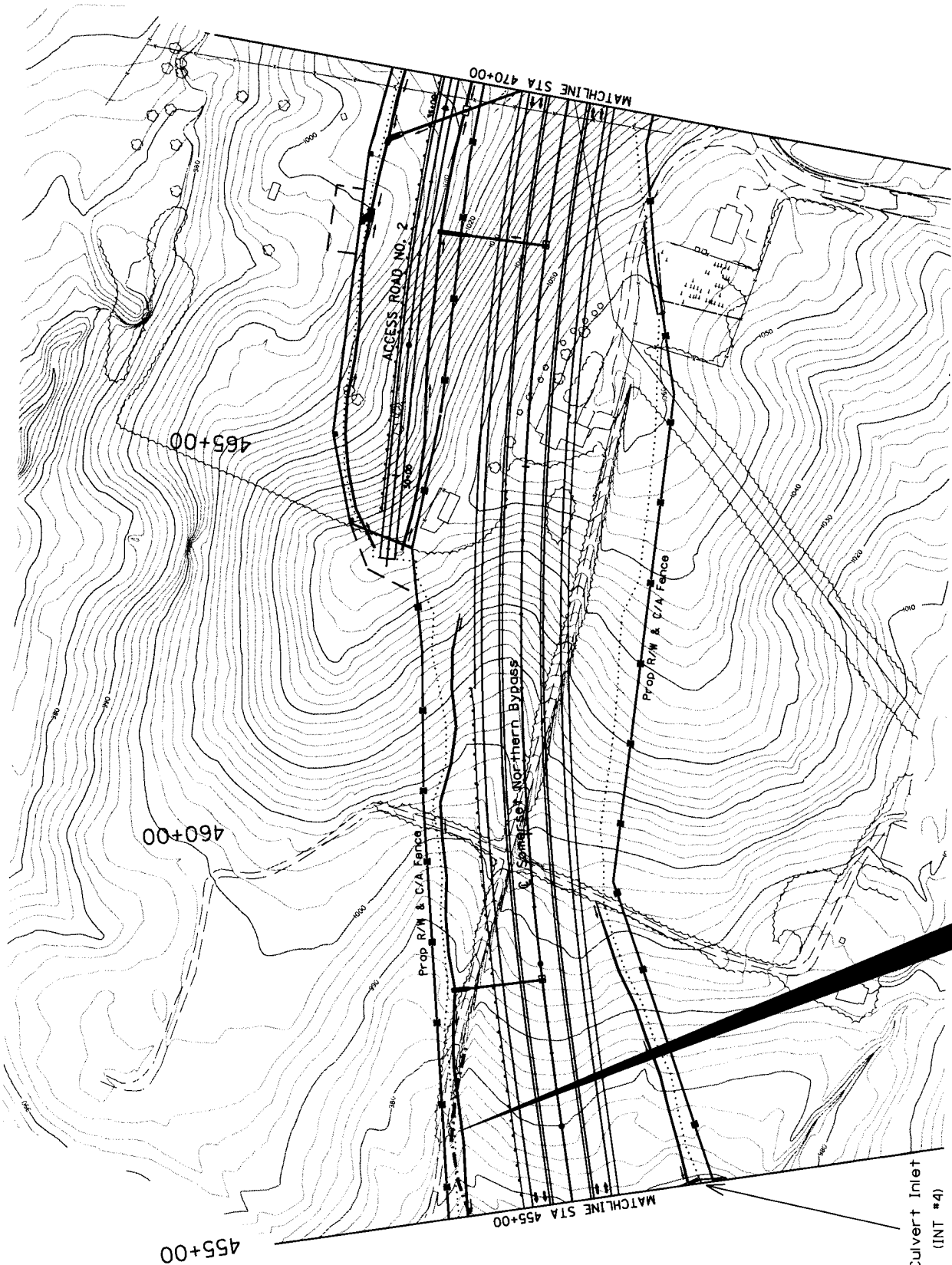
SITE 9

INT #4
Impacts= 393'
EPH #4
Impacts= 312'

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESMT
	EXIST R/W
	EXIST STREAM
	STREAM IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



SCALE 1"=200'

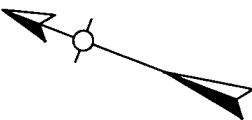


SITE 9
 EPH #4
 Cont. from Plan Sheet 10

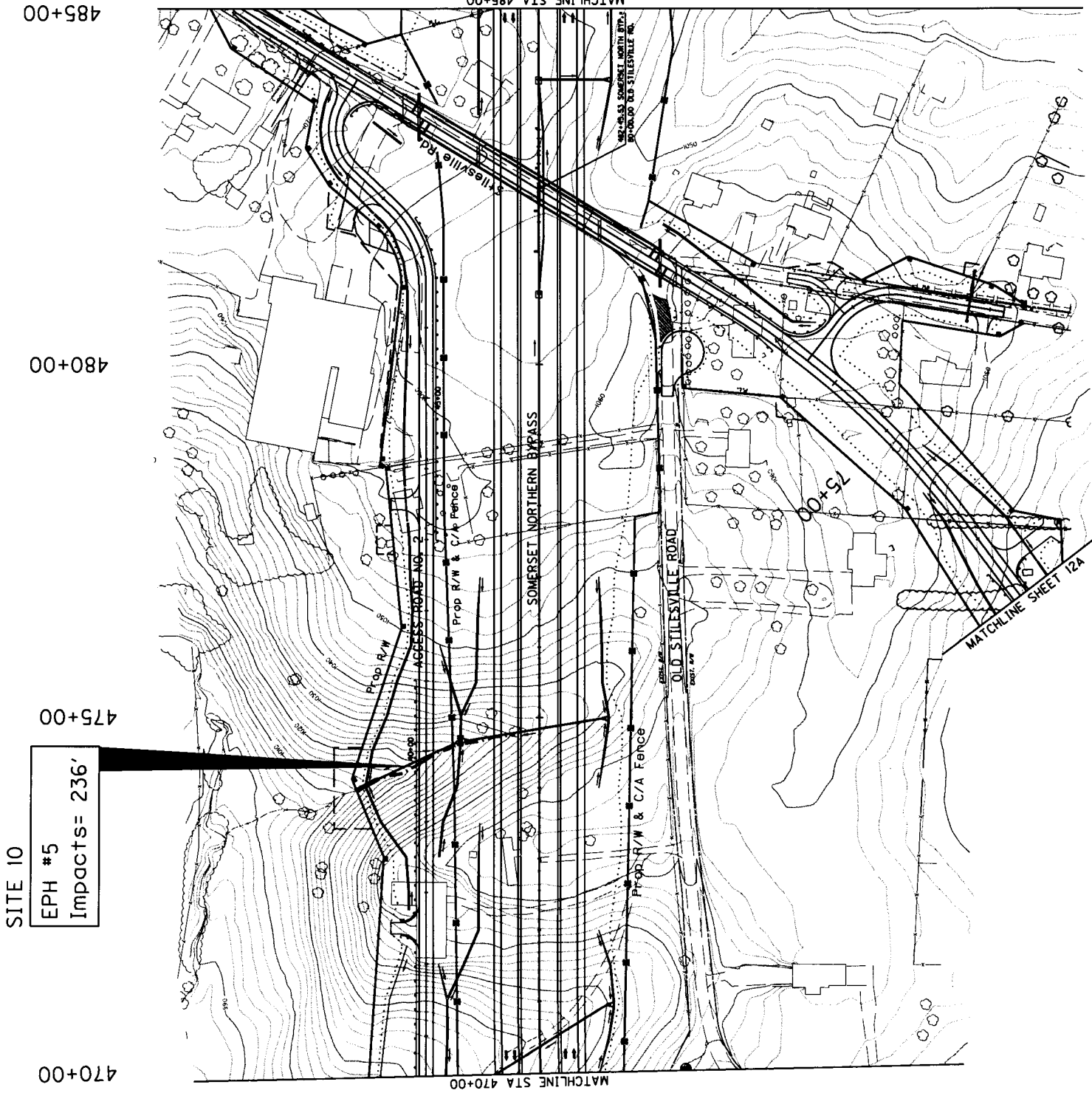
Kentucky Transportation		PROJECT: Somerset Northern Bypass		STREAM: UT to Pitman Creek	
COUNTY: PULASKI	STATE: KENTUCKY	STA 455+00 to STA 470+00	ITEM: 8-59.50	Plan Sheet No. 11	

LEGEND

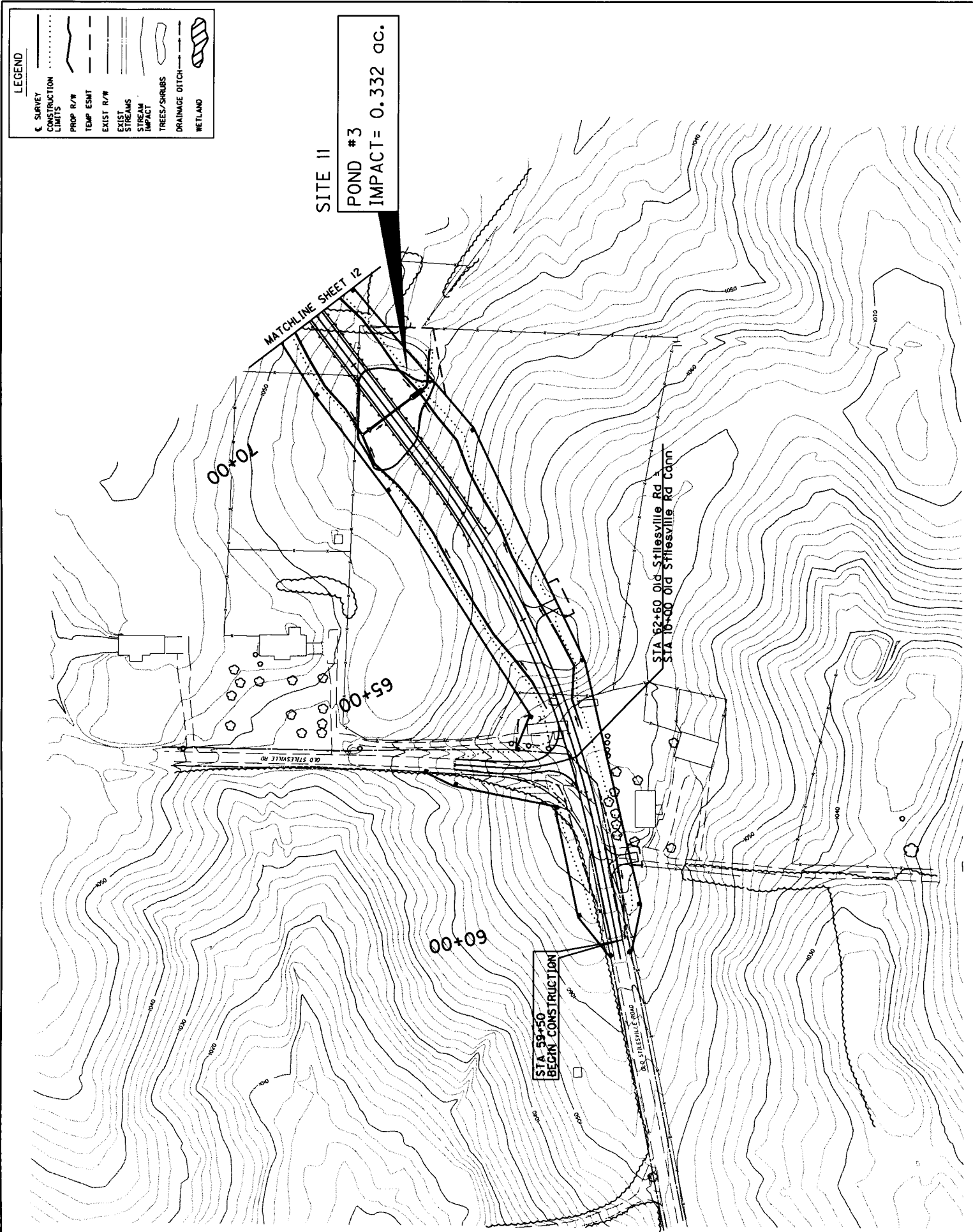
SURVEY
 CONSTRUCTION LIMITS
 PROP. R/W
 TEMP. ESMT
 EXIST. R/W
 EXIST. STREAM
 STREAM IMPACT
 TREES/SHRUBS
 DRAINAGE DITCH
 WETLAND



SCALE 1"=200'

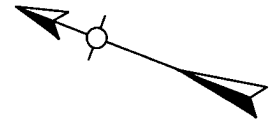


<div> <div>Kentucky</div> <div>Transportation</div> </div>	PROJECT: Somerset Northern Bypass			STREAM: UT to Pitman Creek	
	COUNTY: PULASKI	STATE: KENTUCKY	STA 470+00 to STA 485+00	ITEM: 8-59.50	Plan Sheet No. 12

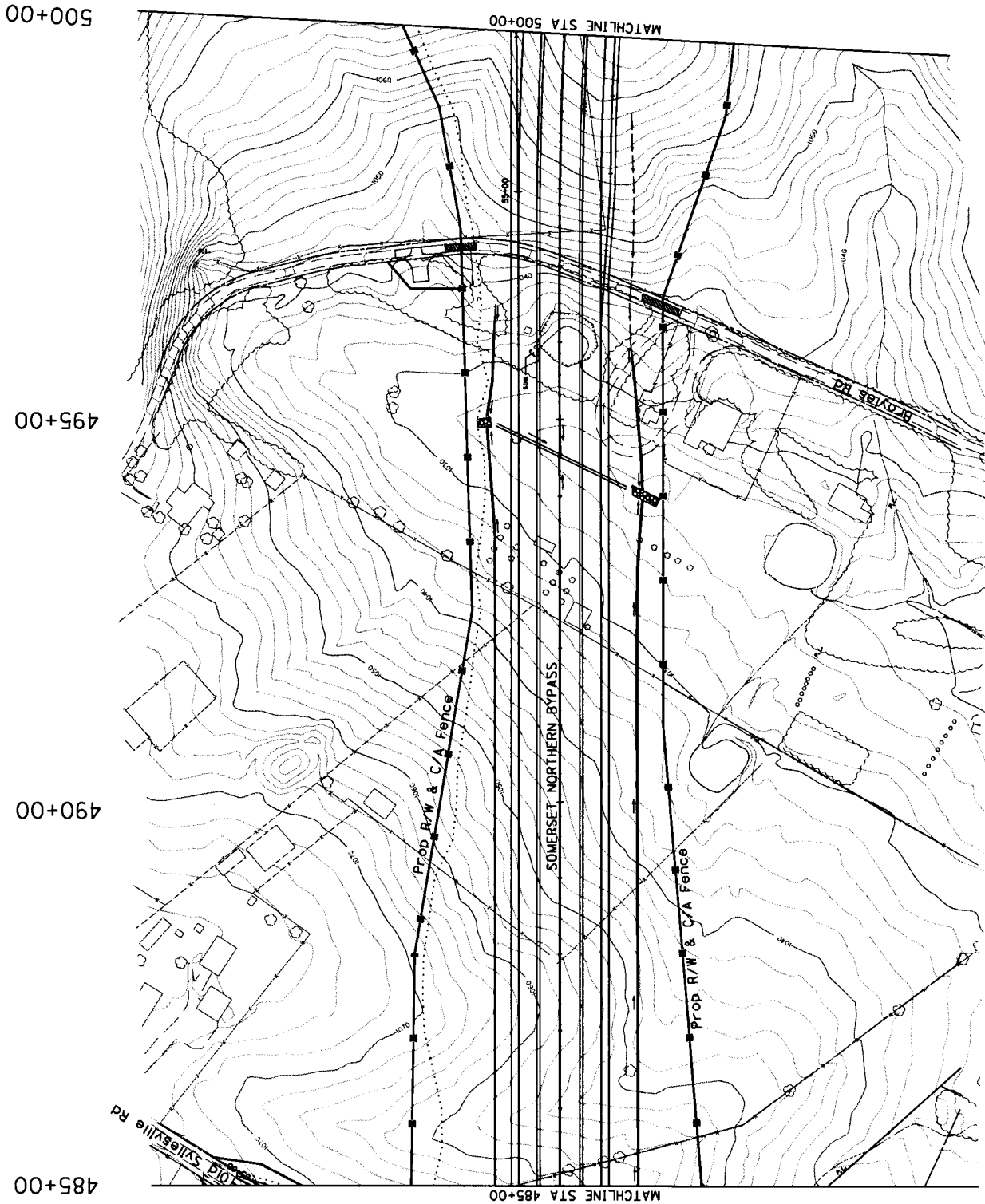


LEGEND

- SURVEY
- CONSTRUCTION LIMITS
- PROP R/W
- TEMP ESMT
- EXIST R/W
- EXIST STREAMS
- STREAM IMPACT
- TREES/SHRUBS
- DRAINAGE DITCH
- WETLAND



SCALE 1"=200'



No Impacts This Sheet

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impact

COUNTY: PULASKI

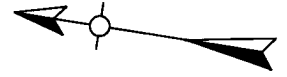
STATE: KENTUCKY

STA 485+00 to STA 500+00

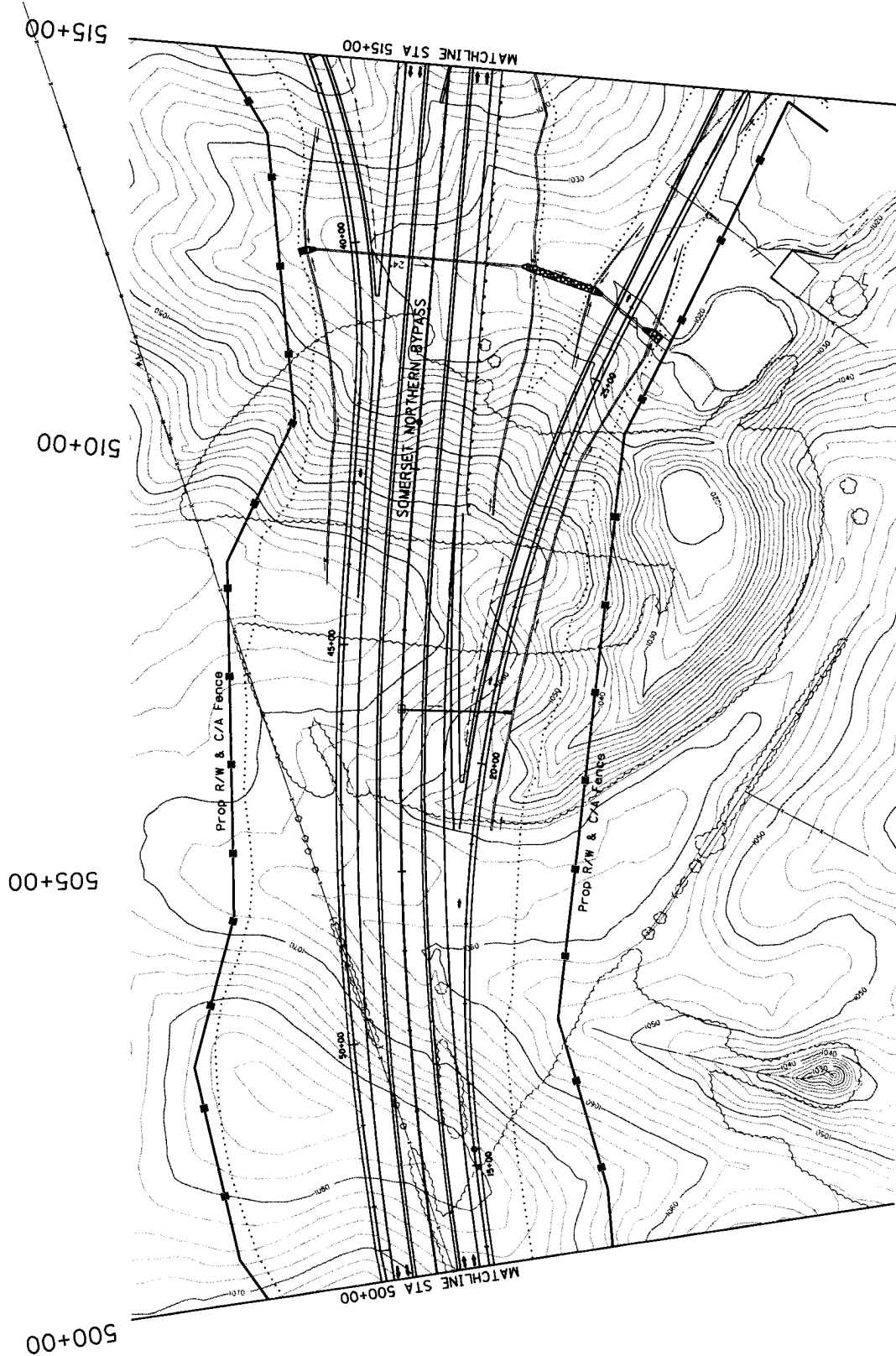
ITEM: 8-59.50

Plan Sheet No. 13

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESMT
	EXIST R/W
	EXIST STREAMS
	STREAM IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



SCALE 1"=200'



No Impacts This Sheet

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: No Impact

COUNTY: PULASKI

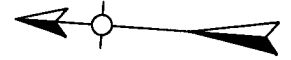
STATE: KENTUCKY

STA 500+00 to STA 515+00

ITEM: 8-59.50

Plan Sheet No. 14

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP. R/W
	TEMP. ESM
	EXIST. R/W
	EXIST. STREAM
	STREAM IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



SCALE 1"=200'

530+00

SITE 13

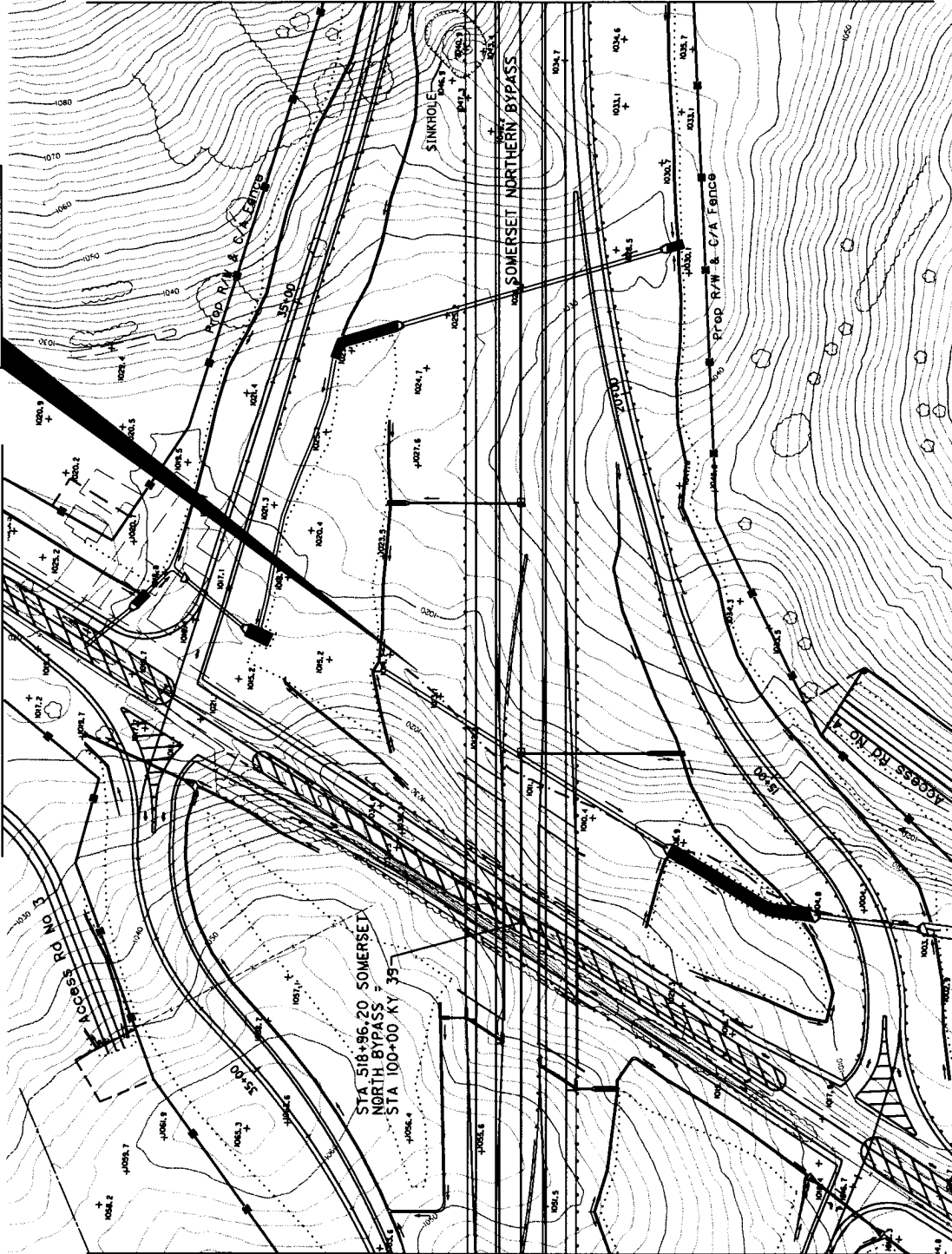
EPH #6
Impact= 746'

525+00

No Impacts Beyond Matchline

520+00

515+00



MATCH SHEET 15A

**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: Ephemeral channel to sinkhole

COUNTY: PULASKI

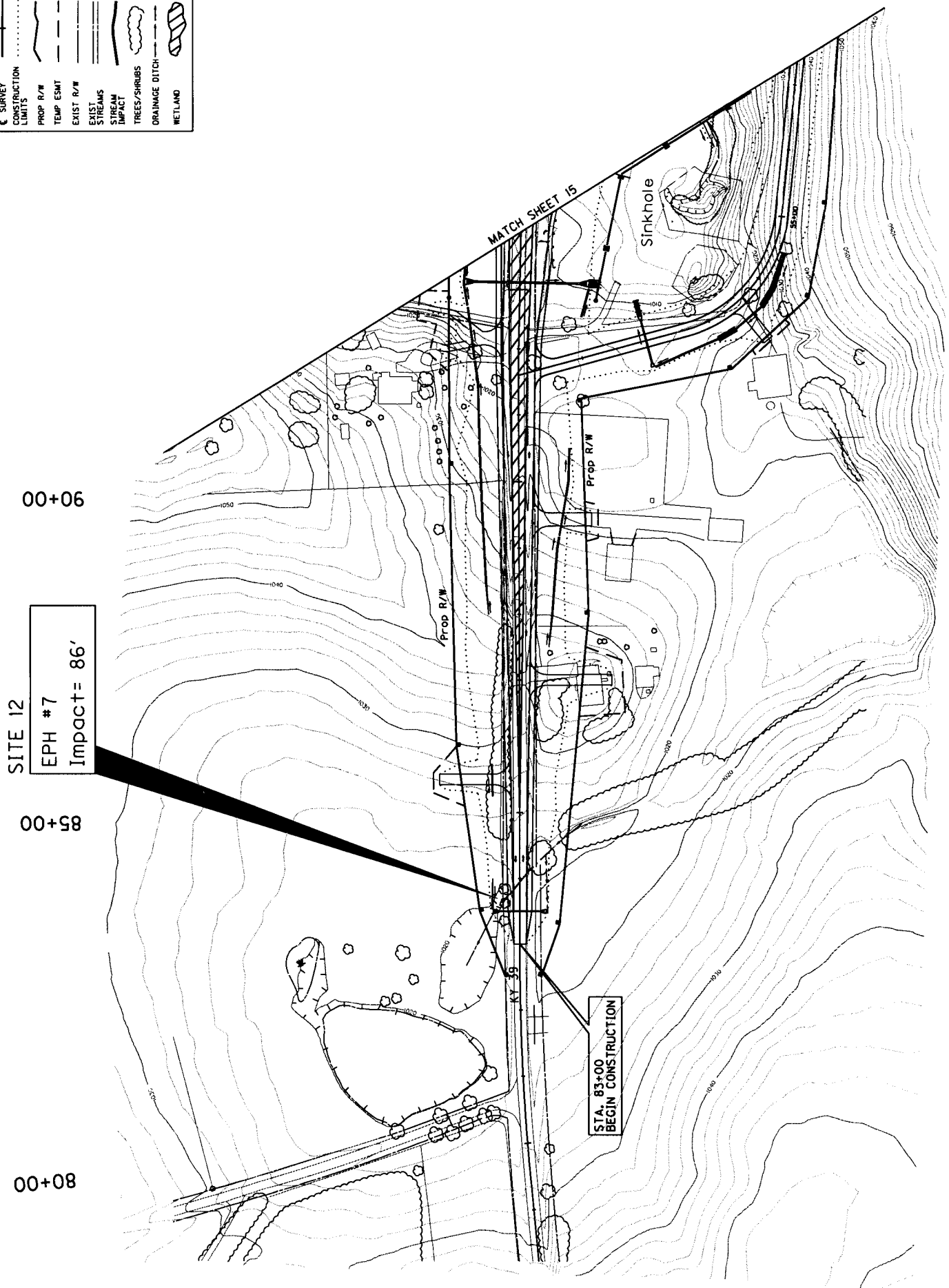
STATE: KENTUCKY

STA 515+00 to STA 530+00

ITEM: 8-59.50

Plan Sheet No. 15

LEGEND	
	SURVEY
	CONSTRUCTION LIMITS
	PROP R/W
	TEMP ESMT
	EXIST R/W
	STREAM
	IMPACT
	TREES/SHRUBS
	DRAINAGE DITCH
	WETLAND



**Kentucky
Transportation**

PROJECT: Somerset Northern Bypass

STREAM: Ephemeral channel to sinkhole

COUNTY: PULASKI

STATE: KENTUCKY

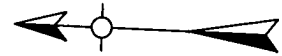
STA 83+50 (KY 39)

ITEM: 8-59.50

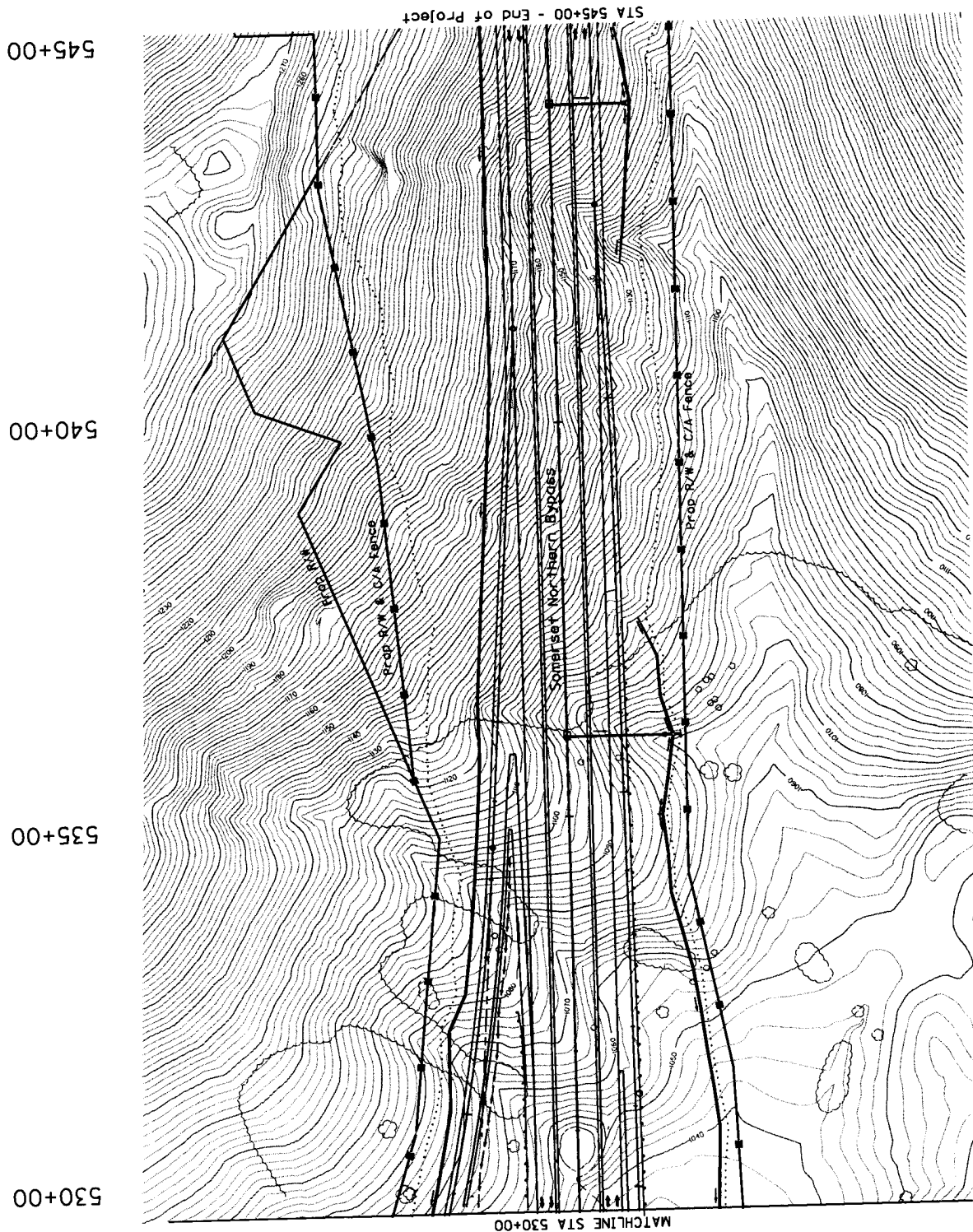
Plan Sheet No. 15A

LEGEND

SURVEY
 CONSTRUCTION LIMITS
 PROP R/W
 TEMP ESMT
 EXIST R/W
 EXIST STREAM
 STREAM IMPACT
 TREES/SHRUBS
 DRAINAGE DITCH
 WETLAND

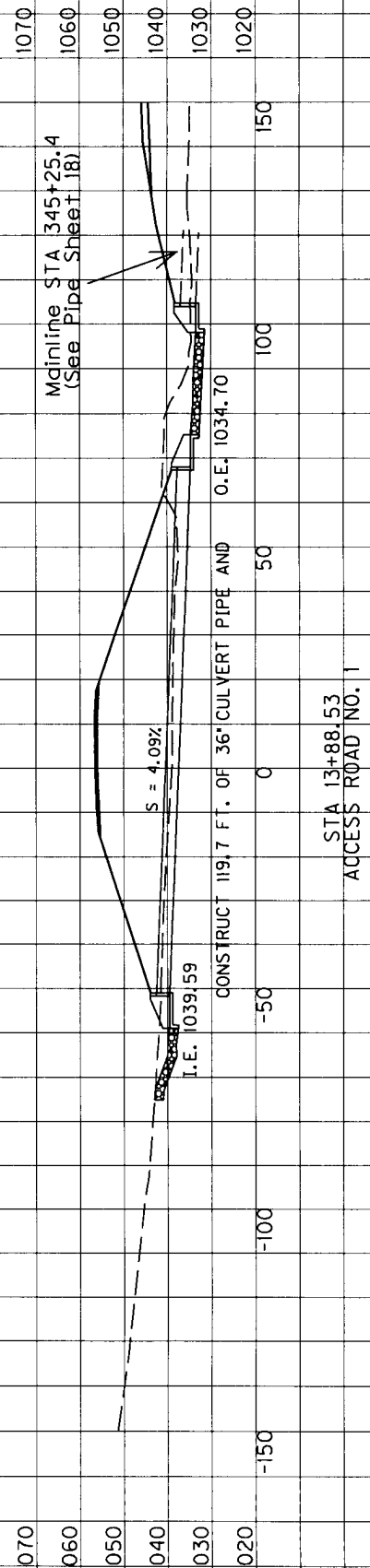
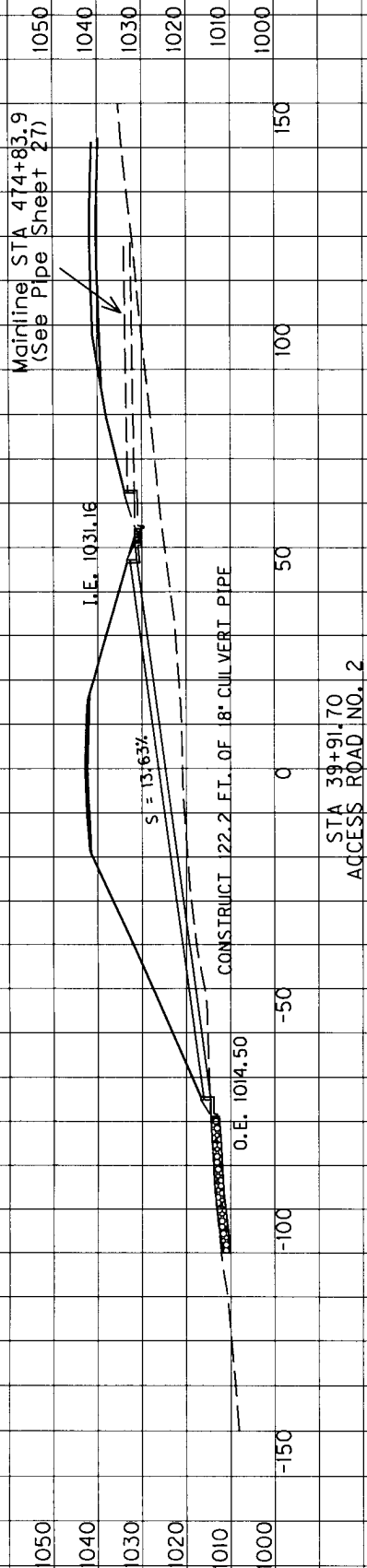


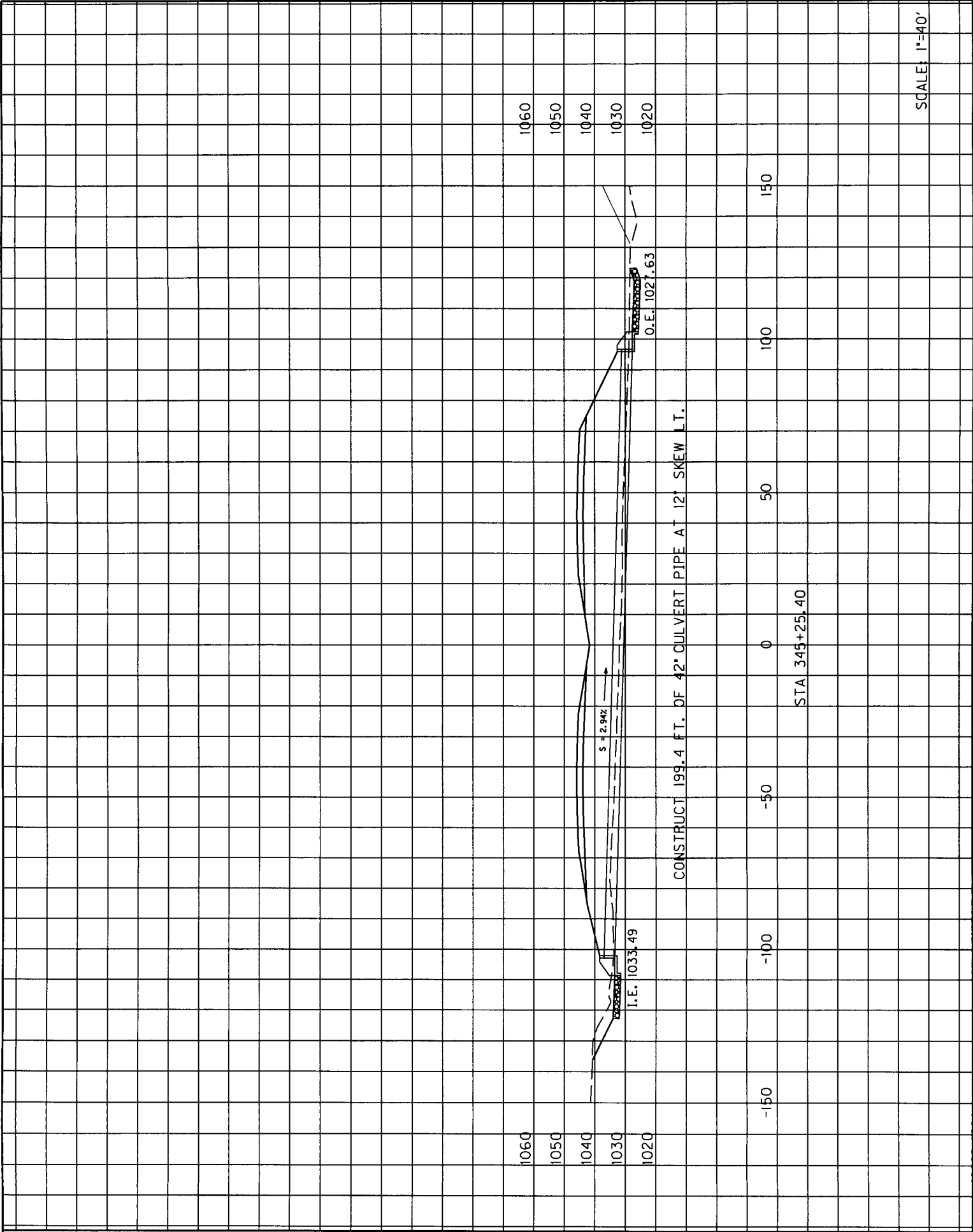
SCALE 1"=200'



No Impacts This Sheet

Kentucky Transportation	PROJECT: Somerset Northern Bypass			STREAM:	
	COUNTY: PULASKI	STATE: KENTUCKY	STA 530+00 to STA 545+00 (Project End)	ITEM: 8-59.50	Plan Sheet No. 16





SCALE: 1"=40'

1060
1040
1020
1000

1060
1040
1020
1000

PROPOSED 54" PIPE

1000

500

0

500

1000

STREAM PROFILE

EX. FL = 1021.1

O.E. 1021.96

I.E. 1023.57

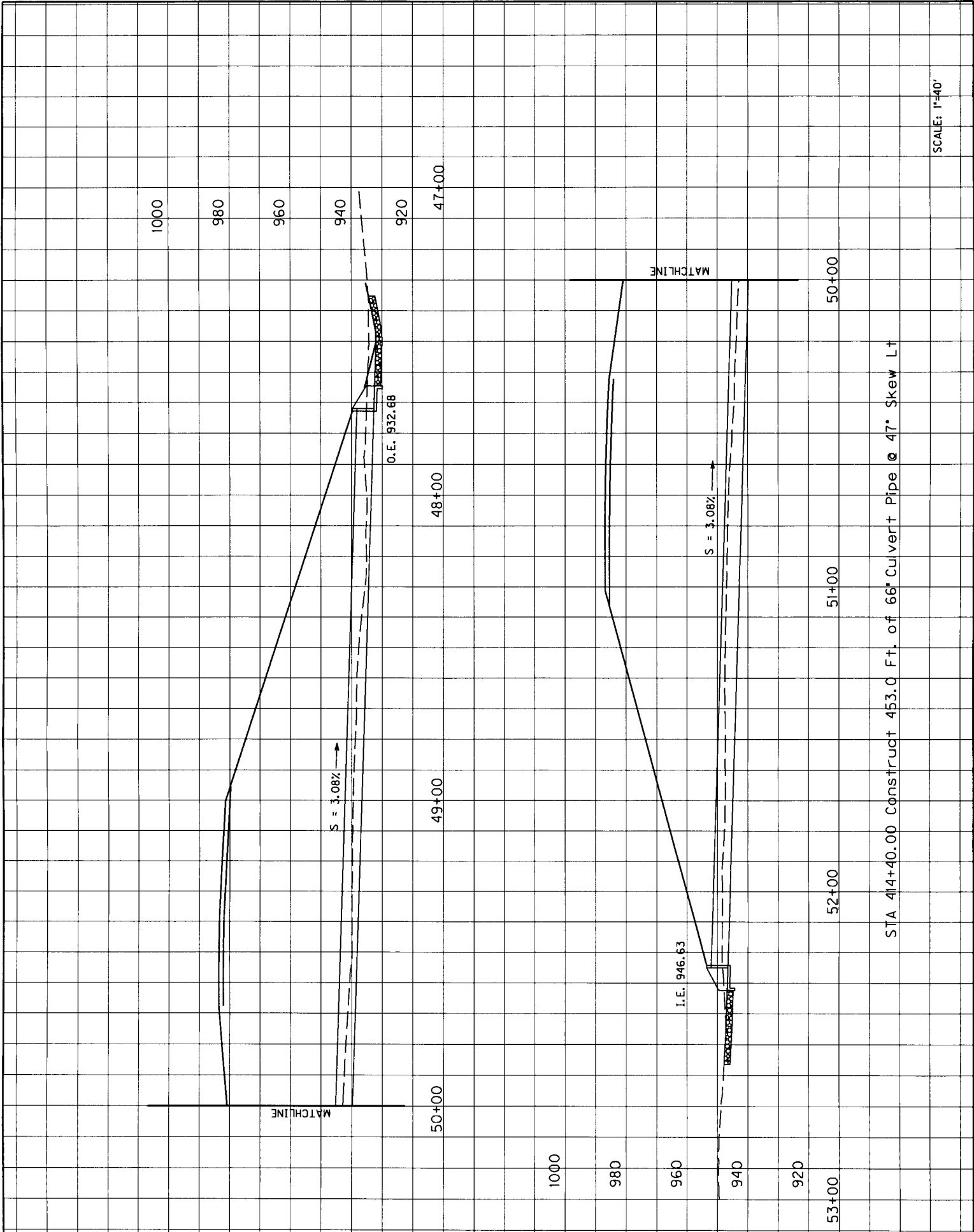
S = 2.21%

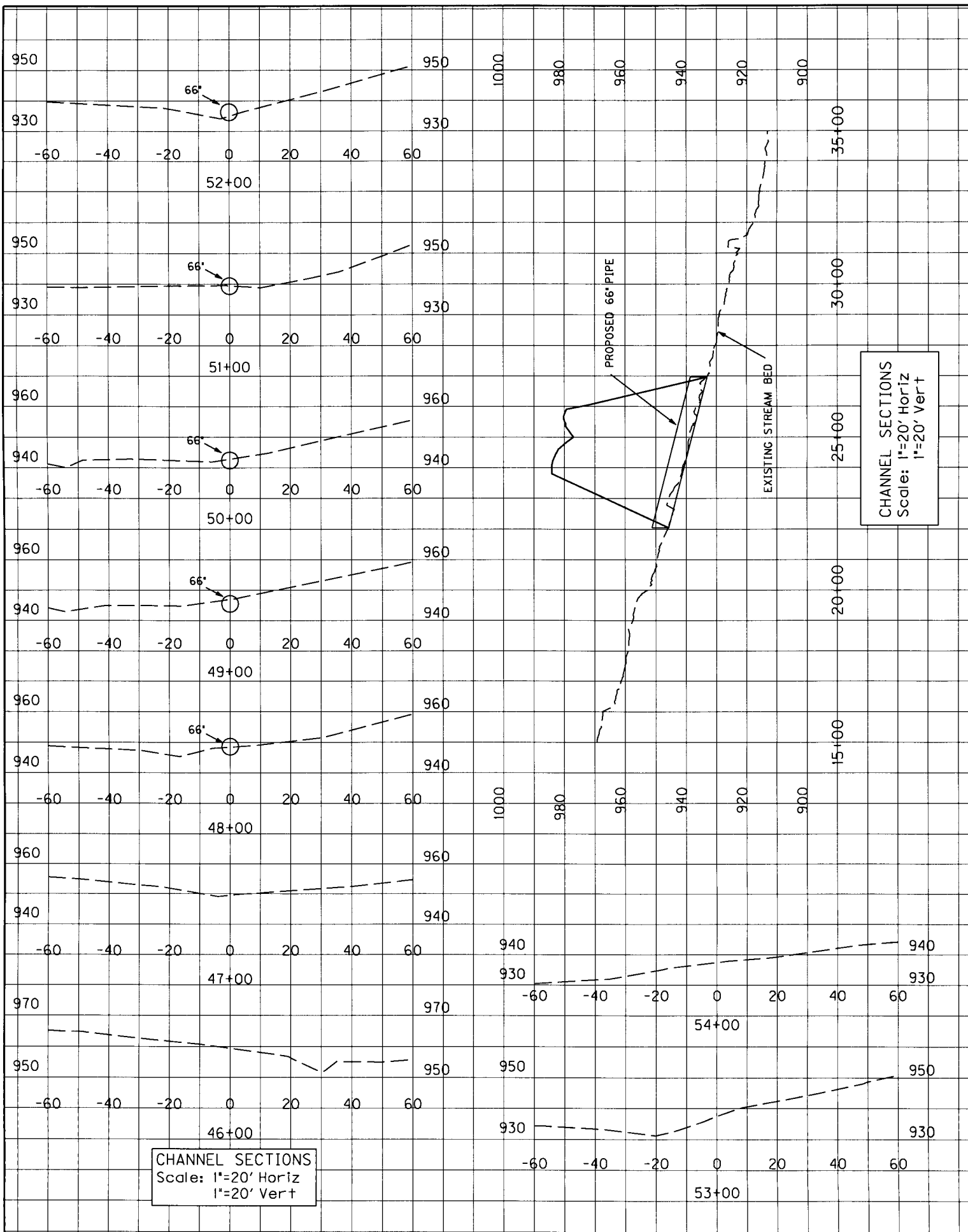
49+00

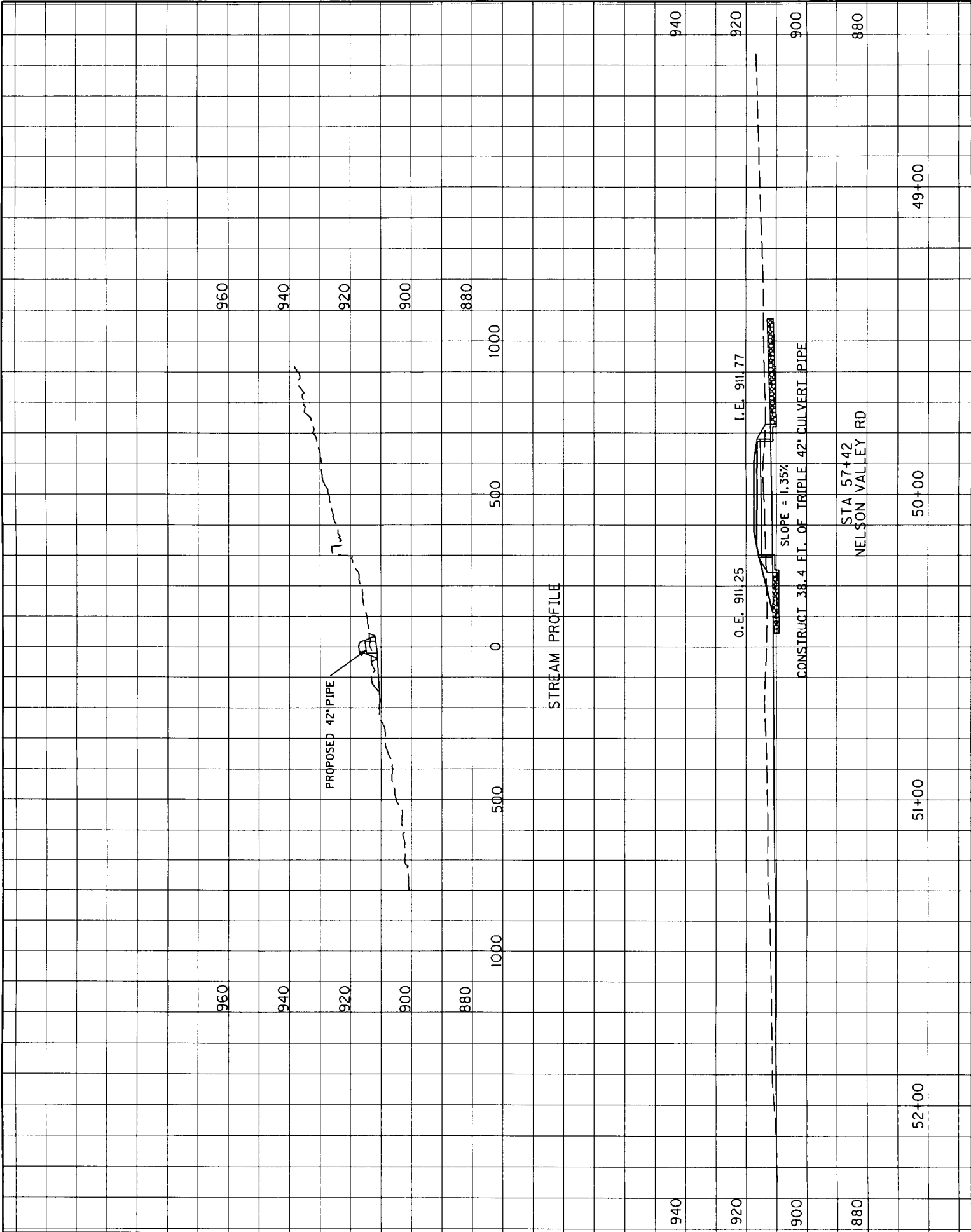
50+00

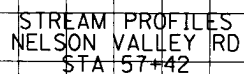
51+00

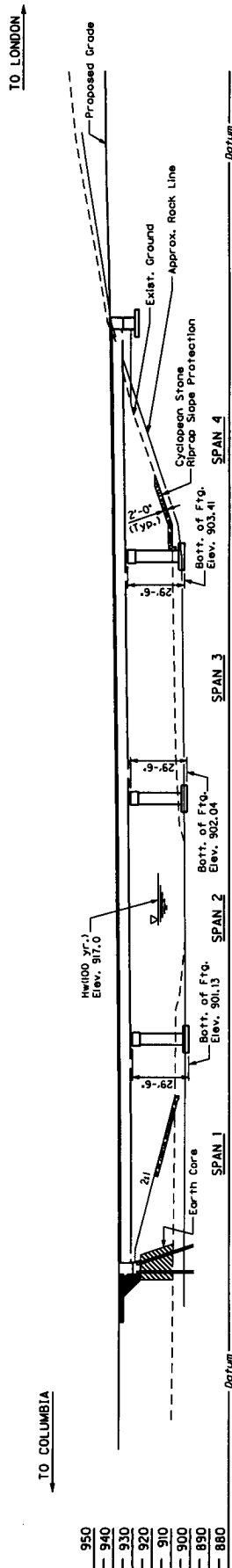
STA 67+33.8
CONSTRUCT 73.0 FT. OF 54" CULVERT PIPE





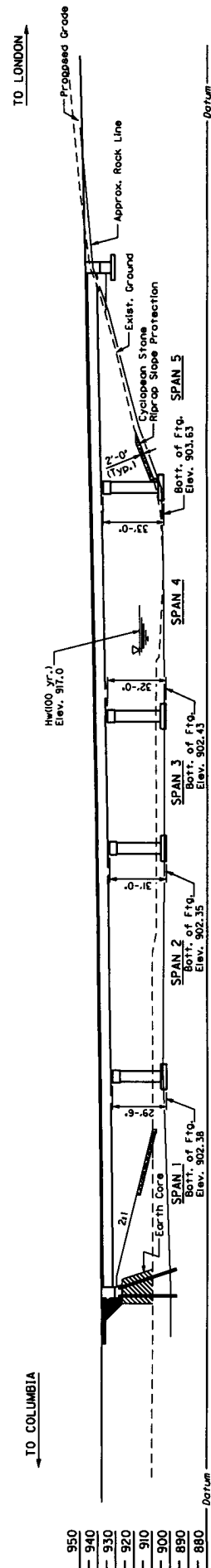






SECTION ALONG C EASTBOUND STRUCTURE

4 Spans at 120'-0", 125'-0", 125'-0", 120'-0"
 44'-0" Bridge Roadway
 60° Skew Rt. ~ 140'-0" Shoulder Width at Bridge ~ 2:1 Fill Slopes

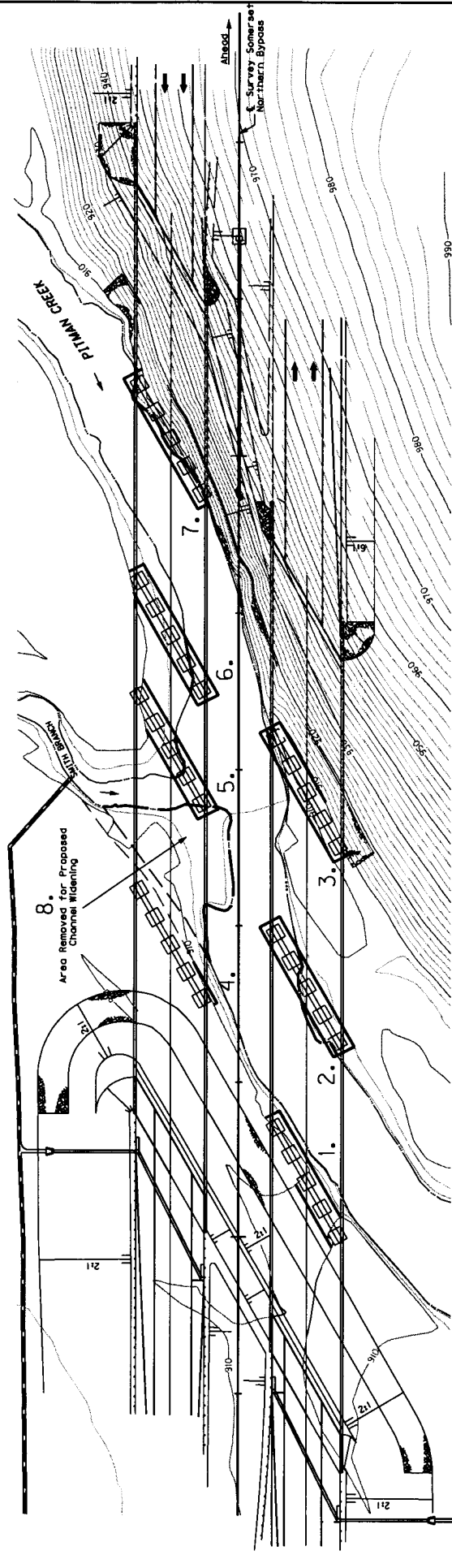


SECTION ALONG C WESTBOUND STRUCTURE

5 Spans at 120'-0", 125'-0", 73'-0", 125'-0", 120'-0"
 44'-0" Bridge Roadway
 60° Skew Rt. ~ 140'-0" Shoulder Width at Bridge ~ 2:1 Fill Slopes

435+00

440+00



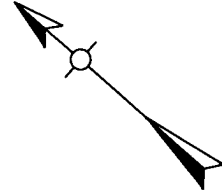
SITE	AREA (ac.)	LENGTH (ft.)
1.	0.018	
2.	0.032	82
3.	0.030	24
4.	0.001	
5.	0.028	33
6.	0.032	37
7.	0.021	101
8.	0.091*	200*

* (Pitman Ck. = 115 ft. & 0.046 ac., Smiths Br. = 85 ft. & 0.045 ac.)

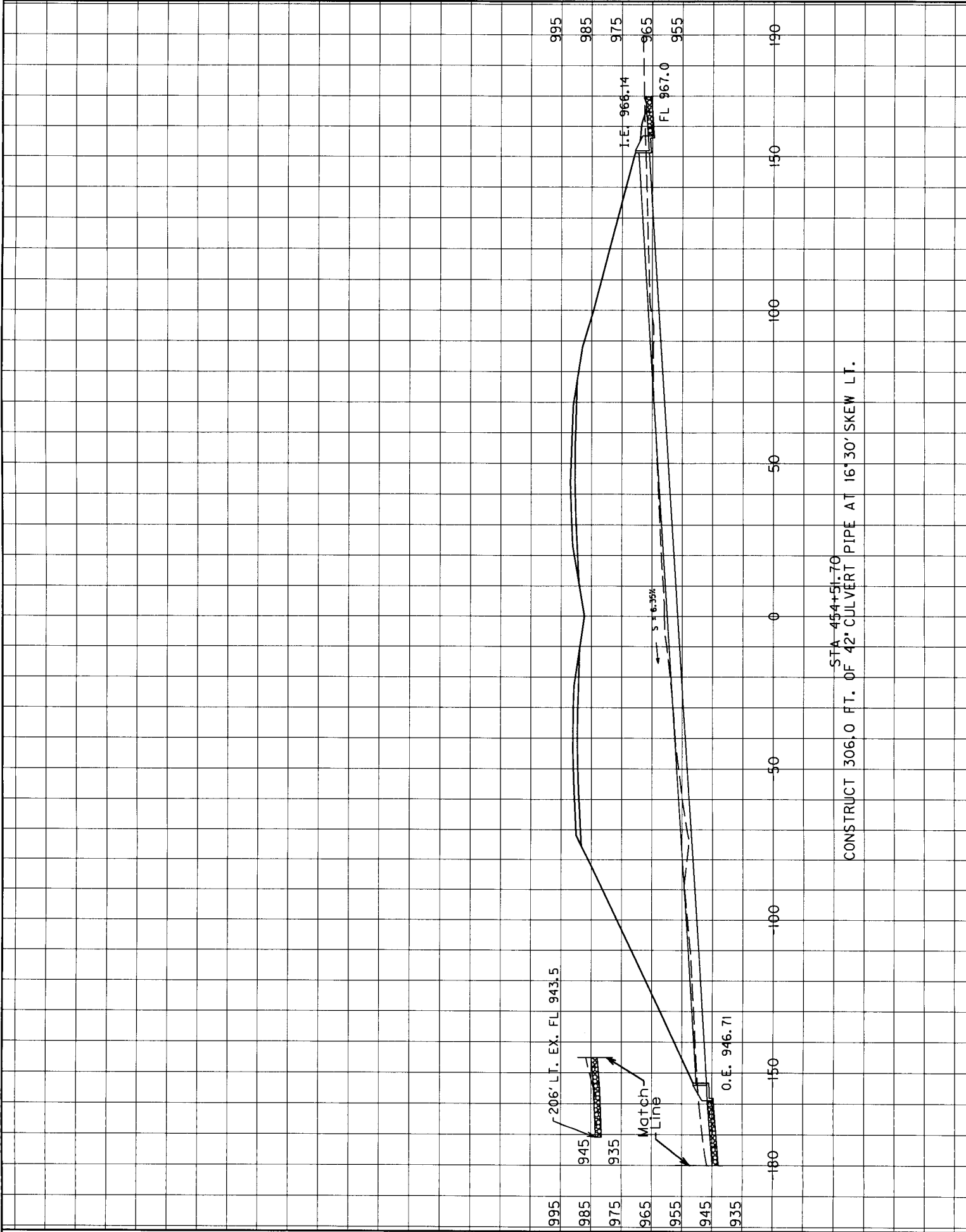
APPROX. STREAMBANK
IMPACT

APPROX. IMPACT AREA
(BELOW OHW*) FOR PIERS

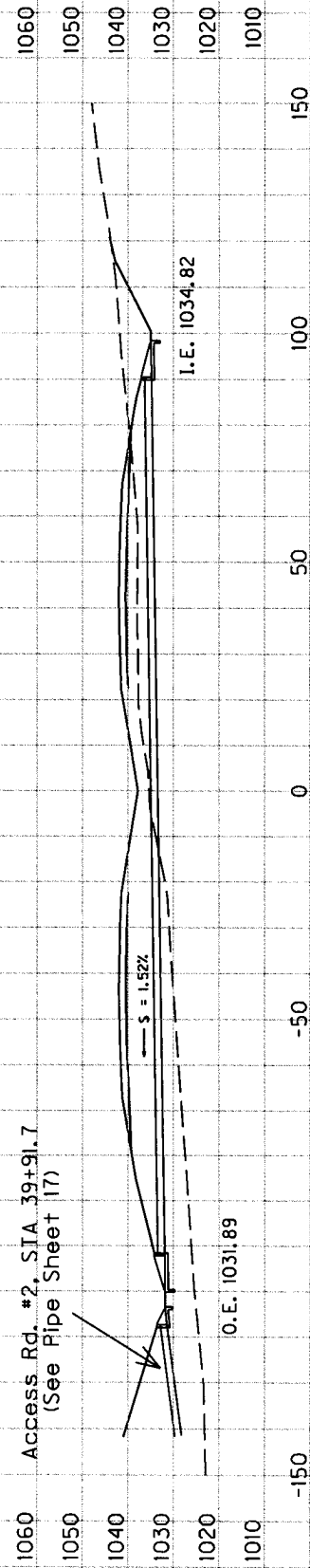
* Conservatively Assumed 4'± above
normal pool (OHW = 910' MSL)



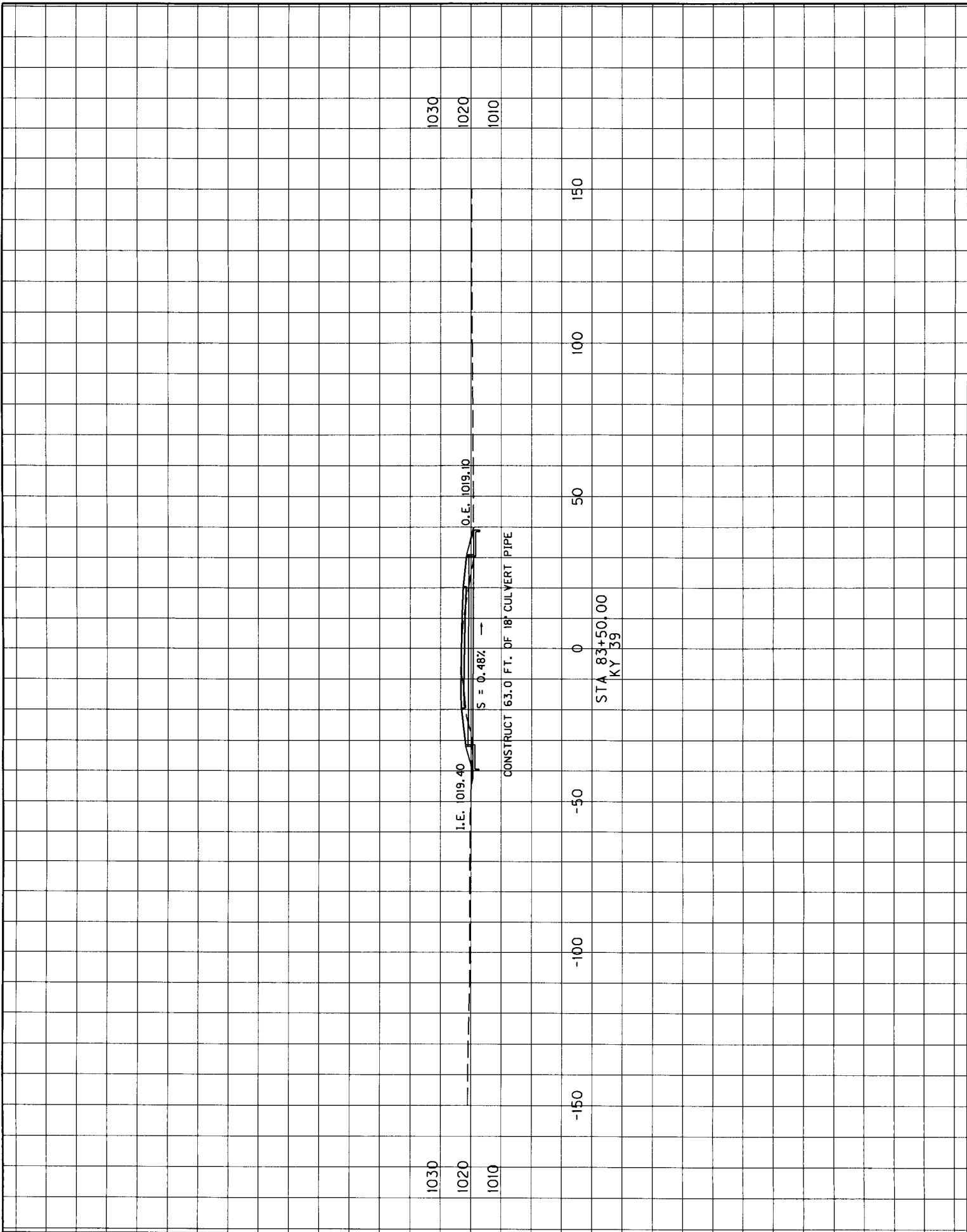
SCALE 1"=100'

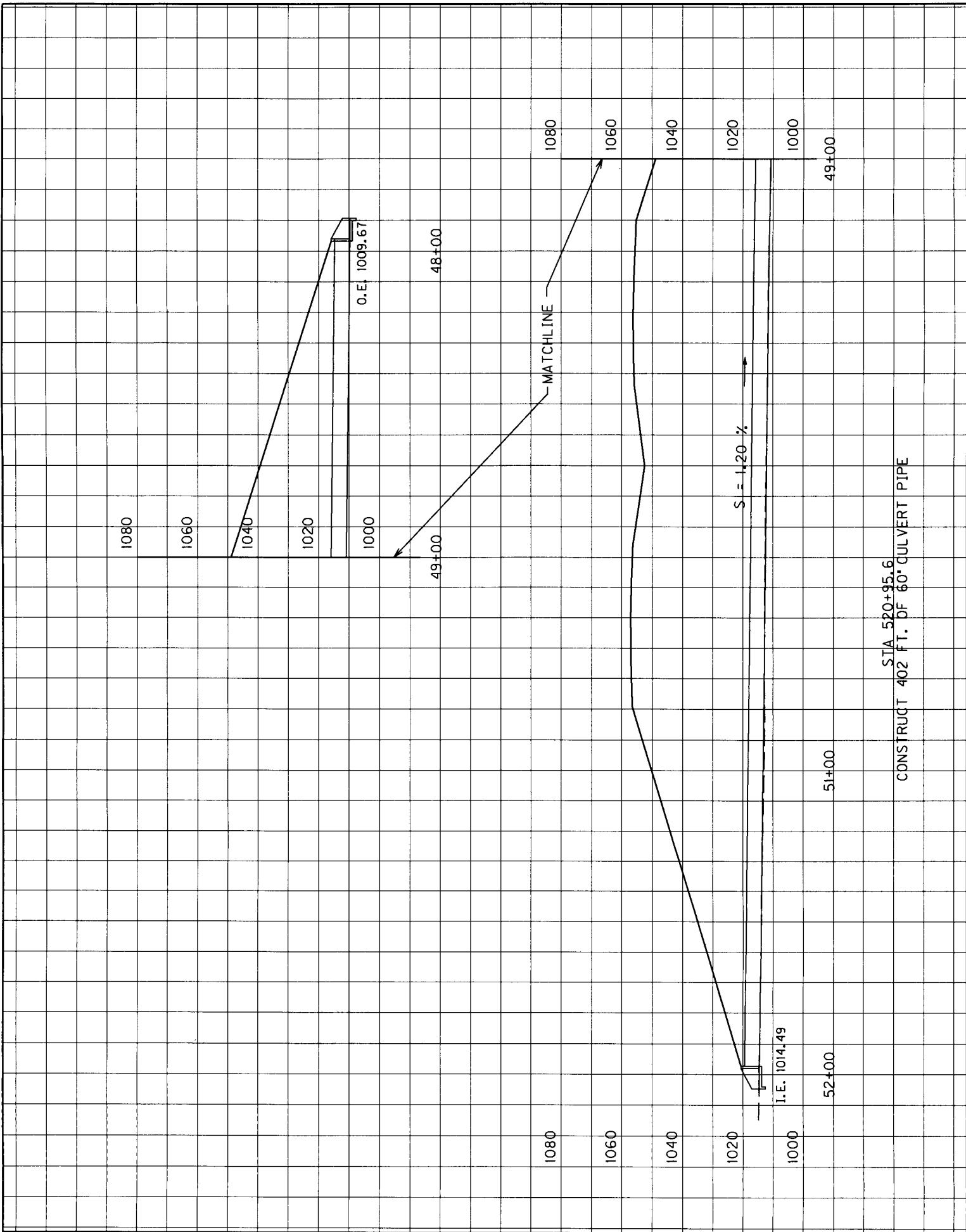


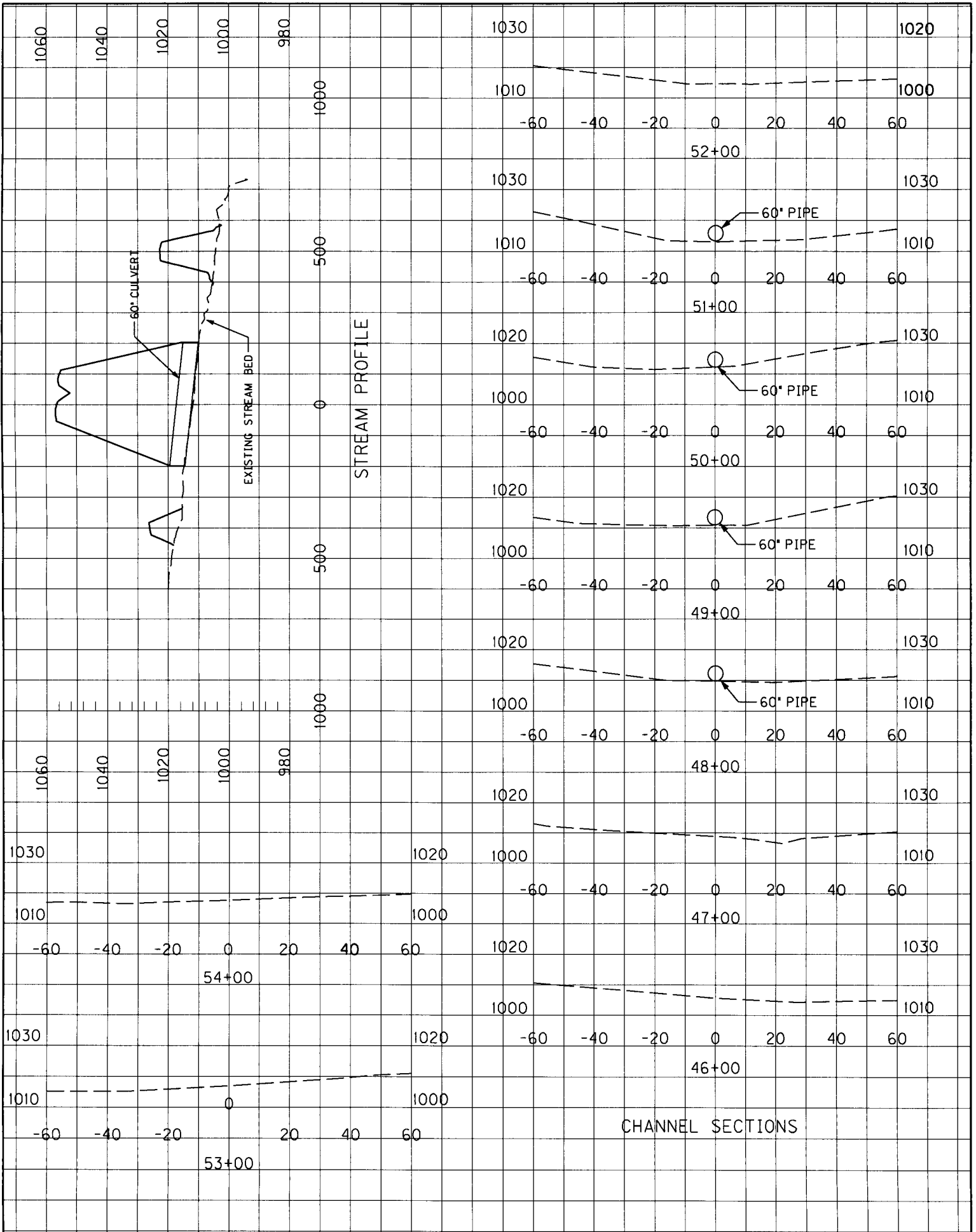
STA 454+51.70
CONSTRUCT 306.0 FT. OF 42" CULVERT PIPE AT 16°30' SKEW LT.

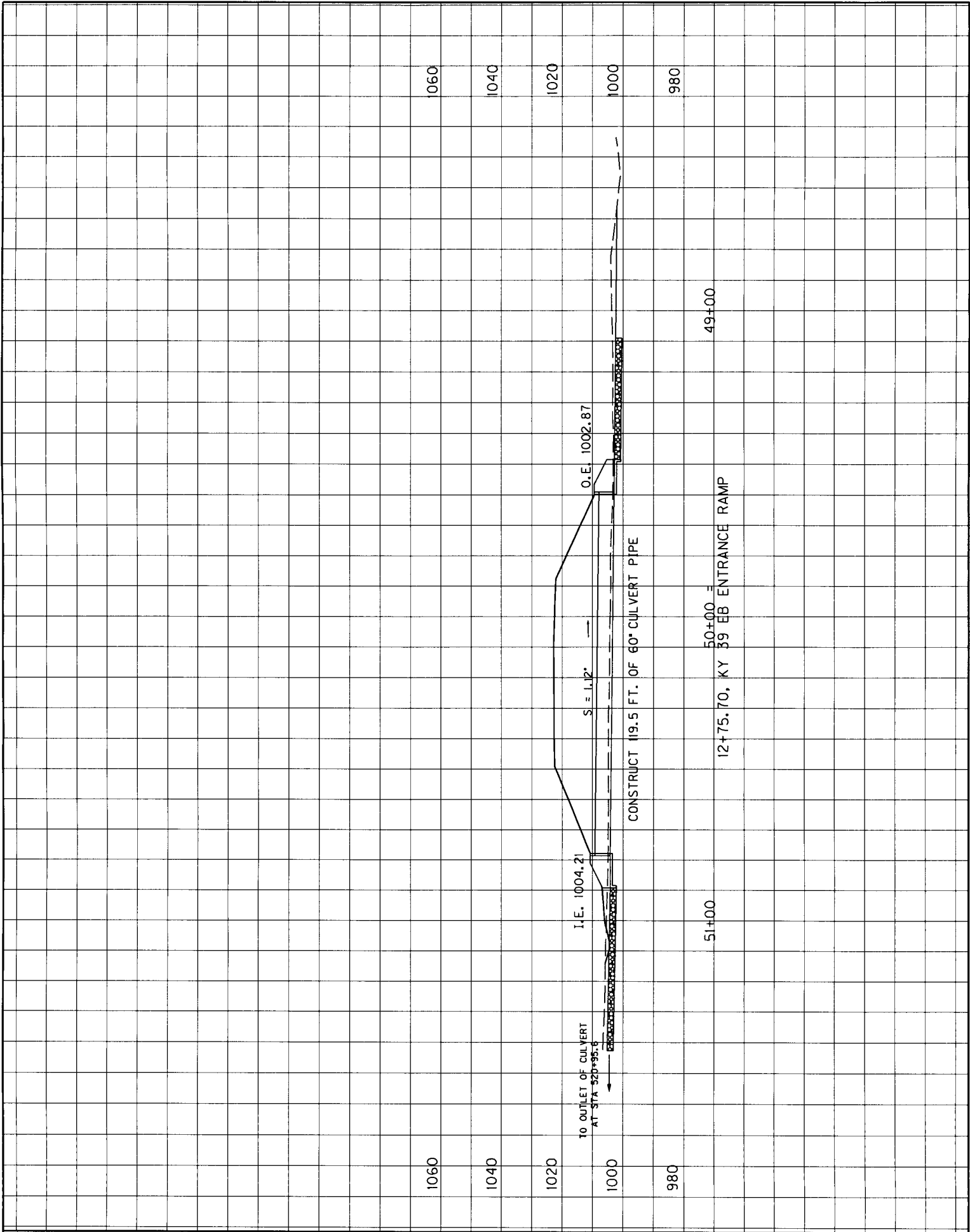


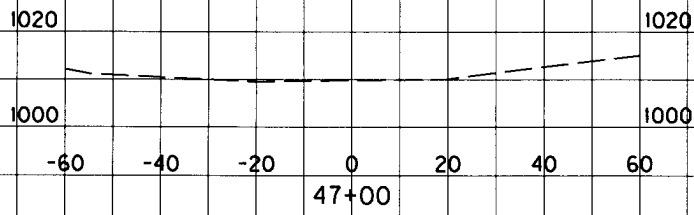
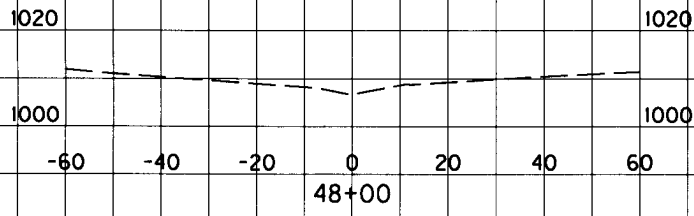
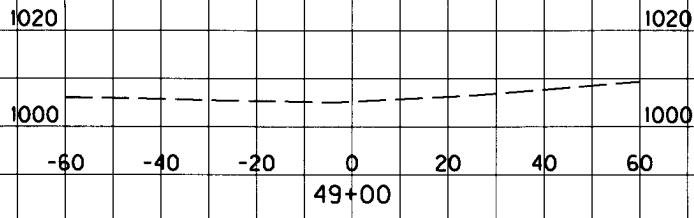
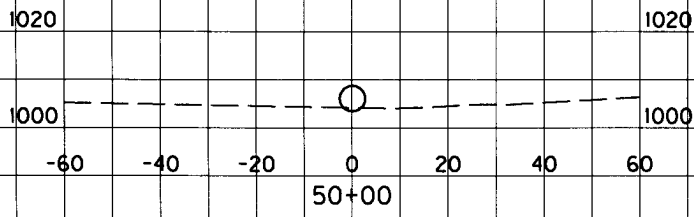
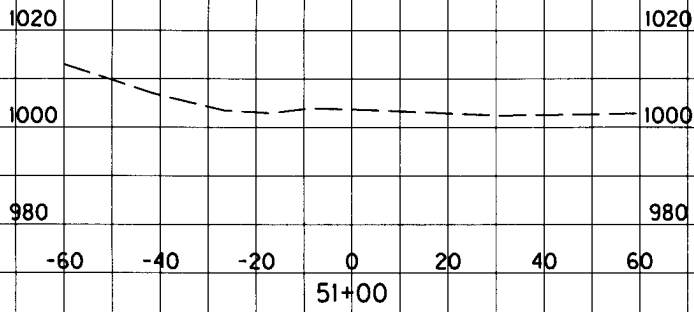
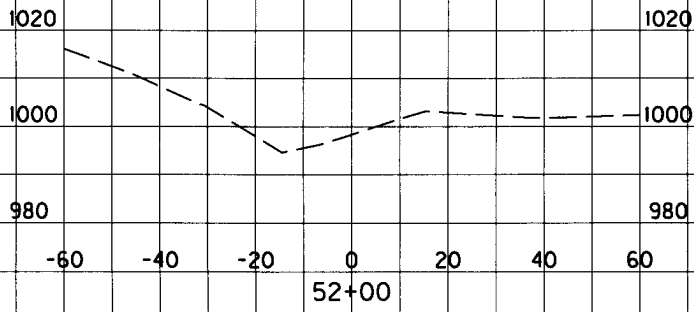
STA 474+83.90
CONSTRUCT 192.6 FT. OF 18" CULVERT PIPE



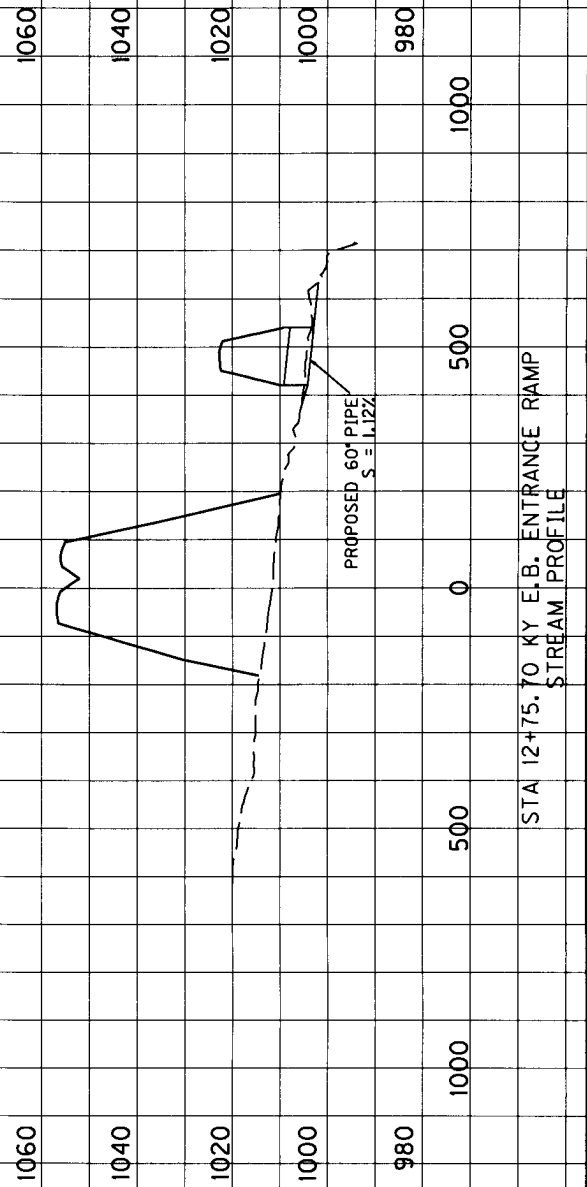








KY39 E.B. ENTRANCE RAMP STA 12+75.70
CHANNEL SECTIONS



STA 12+75.70 KY E.B. ENTRANCE RAMP
STREAM PROFILE

MITIGATION DISCUSSION
Pulaski Co., Somerset Northern Bypass
Item No. 8-59.50

For intermittent and perennial stream impacts, the need for mitigation was based on whether an impact site was greater than 0.10 acres in area (including wetland impact acreage where appropriate), greater than 300 feet in length, or was determined to be a Special Aquatic Site (i.e., riffle/pool complex). For ephemeral streams, mitigation needs were based on impacts greater than 0.10 acres, but no length was utilized. However, the Division of Water (DOW) not only requires mitigation for intermittent and perennial streams where the impact is greater than 300 feet, but where the cumulative unmitigated impacts, within a 14-digit HUC watershed, exceeds 500 feet. There are four 14-digit HUC's that define the project site; listed below in order from project beginning to end. (It should be noted that Pitman Creek, at a proposed bridge site (near Sta. 436+75), is divided into two 14-digit HUC's):

Dry Branch	=	05130103-050-080
Pitman Creek	=	" -050-050 (Upstream of Bridge Site)
	=	" -050-070 (Downstream of Bridge Site)
Smiths Branch	=	" -050-060

In the Dry Branch watershed there is impact to one intermittent stream (INT#1), resulting from a series of three culverts. INT#1 has an accumulative 744 feet of impact; and requires mitigation under both COE and DOW criteria.

The Pitman Creek watershed is divided at the bridge site into two HUC's (called Lower and Upper for purposes of this discussion). The Lower watershed has three impacts on two intermittent streams (INT#2, INT#3-US, and INT#3-DS). One of the impacts is less than 300 feet; but involves a riffle/pool complex stream. Therefore, mitigation is required for all sites by the COE and DOW criteria. The Upper watershed has one impact to an intermittent stream (INT#4), that is over 300 feet, requiring mitigation by the COE and DOW.

At the bridge site, which appears to be in the Lower HUC for Pitman Creek and the Smiths Branch HUC, impacts are defined by streambank impacts and not lengths of whole channels impacted. The impacts in the Smiths Branch watershed are less than 300' to either streambank, so mitigation should not be required.

In summary, all intermittent streams impacted on this project may require mitigation. No ephemeral streams, based on acreage, required mitigation. Additionally, there are no wetland impacts or subsequent mitigation needs. Mitigation is proposed by payment of an in lieu fee, based on the Corps of Engineers' Central Kentucky Protocol (see the in-lieu fee payment calculation table).

HUC Analysis of Stream Impacts

HUC #	HUC Name	STA.	Lat. / Long.	Sheet No.	Impact Category	Stream Type	Permit Type	Watershed (acres)	Impact (ft.)	Impact (acres)	RBP Score	Quality	Riffle/Pool Complex	Mitigation Required
05130103-050-080	Dry Branch	341+50 to 348+00	N37-08-06 W84-37-13	3	Culverts	Intermittent	Ind 404/401	49.9	744	0.051	83	Poor	No	Yes
05130103-050-050	Pitman Creek (Upper)	454+52	N37-09-06 W84-35-25	10,11	Culvert	Intermittent	NWP14/401	46.4	393	0.045	124	Poor	No	Yes
05130103-050-070	Pitman Creek (Lower)	410+80	N37-08-39 W84-36-06	8	Culvert	Intermittent	NWP14/401	11.4	312	0.036	118	Poor	No	Yes
"	"	414+40	N37-08-41 W84-36-04	8	Culvert	Intermittent	Ind 404/401	125.3	588	0.108	129	Poor	Yes	Yes
"	"	426+59 (57+42)	N37-08-42 W84-35-51	8	Culvert	Intermittent	NWP14/401	139.7	274	0.025	96	Poor	Yes	Yes
"	"	436+75	N37-08-55 W84-35-40	9	Bridge	Perennial	NWP14/401	15526.4	207 LB 152 RB	0.083 0.097	126	Average	Yes	No
05130103-050-060	Smiths Br.	436+75	N37-08-55 W84-35-40	9	Bridge	Perennial	NWP14	1182.7	33 LB 85 RB	0.028 0.045	128	Average	Yes	No

Item No. 8-59.50 - In Lieu Fee Table																	
Before Impact											After Impact						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site #	Stream Number	Stream Type	Type of Impact	Acreage of Impact	Watershed size in acres	Initial RPB Score	Initial Quality	Impact Length	Ratio	Debit	Mitigation Required?	Predicted RPB score	Predicted Quality	Final Length	Final Ratio	Credits	Balance
1	INT#1	inter	culvert	0.051	49.9	83	poor	744	1	744	y	0		0	0	0	-744
4	INT#2	inter	culvert	0.036	11.4	118	poor	312	1	312	y	0		0	0	0	-312
5	INT#3US	inter	culvert	0.108	125.3	129	poor	588	1	588	y	0		0	0	0	-588
6	INT#3DS	inter	culvert	0.025	139.7	96	poor	274	1	274	y	0		0	0	0	-274
9	INT#4	inter	culvert	0.045	46.4	124	poor	393	1	393	y	0		0	0	0	-393

Estimated In-lieu fee: (\$100/ft + 20%)
 Intermittent= \$277,320.00

Total
 -2311

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD: Kentucky Transportation Cabinet, 200 Mero Street, Frankfort, KY 40622; c/o Dave Harmon

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)**

State: Kentucky County/parish/borough: Pulaski City: Somerset (nearest)
Center coordinates of site (lat/long in degree decimal format): Lat. 37.146944° N,
Long. 84.596944° W.

Universal Transverse Mercator: 16 4113877 713419

Name of nearest waterbody: Pitman Cr., Smiths Branch, Dry Branch

Identify (estimate) amount of waters in the review area:

Non-wetland waters: 4162* linear feet: width (ft) and/or 0.515 (open water) acres.

*not including streambank impacts due to bridge pier construction.

Cowardin Class: N/A

Stream Flow: Perennial= 477' (streambank length, not channel length), Intermittent=2311', Ephemeral= 1851'

Wetlands: 0 acres.

Cowardin Class:

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: N/A

Non-Tidal: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): 10/27/08, 10/28/08, 10/29/08

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - ☐ Office concurs with data sheets/delineation report.
 - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☒ Corps navigable waters' study: Section 10 waters list provided by COE.
- ☒ U.S. Geological Survey Hydrologic Atlas: .
 - ☐ USGS NHD data.
 - ☒ USGS 8 and 12 digit HUC maps.

- ☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24000, Science Hill and Bobtown (most of project is found on the Bobtown quad).
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Pulaski, (1974).
- ☒ National wetlands inventory map(s). Cite name: Science Hill, Bobtown NWI's.
- ☐ State/Local wetland inventory map(s): _____.
- ☒ FEMA/FIRM maps: Pulaski Co. FIRM, dated 7/16/90.
- ☒ 100-year Floodplain Elevation is: 917' MSL, on Pitman Creek (National Geodetic Vertical Datum of 1929)
- ☒ Photographs: ☐ Aerial (Name & Date): _____
or ☒ Other (Name & Date): Taken during assessments.
- ☐ Previous determination(s). File no. and date of response letter: _____.
- ☐ Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the signature is
impracticable)

Pulaski County, Item No. 8-59.50

Stream ID No.	Latitude	Longitude	Flow Regime/ Cowardin Class	Estimated amount of resource in review area	Class of aquatic resource
PER-1*	37.149167	84.594722	Perennial	LB, 33 lin. feet RB, 85 lin. feet	non-section 10 – non-wetland
PER-2*	37.148333	84.594722	Perennial	LB, 207 lin. feet RB, 152 lin. feet	non-section 10 – non-wetland
INT-1	37.135000	84.620278	Intermittent	744 linear feet	non-section 10 – non-wetland
INT-2	37.144167	84.601667	Intermittent	312 linear feet	non-section 10 – non-wetland
INT-3	37.144722	84.601111	Intermittent	862 linear feet	non-section 10 – non-wetland
INT-4	37.151667	84.590278	Intermittent	393 linear feet	non-section 10 – non-wetland
EPH-1	37.134722	84.621944	Ephemeral	362 linear feet	non-section 10 – non-wetland
EPH-2	37.141944	84.604444	Ephemeral	64 linear feet	non-section 10 – non-wetland
EPH-3	37.149722	84.593333	Ephemeral	45 linear feet	non-section 10 – non-wetland
EPH-4	37.152500	84.589722	Ephemeral	312 linear feet	non-section 10 – non-wetland
EPH-5	37.154444	84.584167	Ephemeral	236 linear feet	non-section 10 – non-wetland
EPH-6	37.156389	84.569444	Ephemeral	746 linear feet	non-section 10 – non-wetland
EPH-7	37.153611	84.571944	Ephemeral	86 linear feet	non-section 10 – non-wetland
Pond#1	37.137400	84.617404	Open Water	0.168 acres	non-section 10 – non-wetland
Pond#2	37.142332	84.604105	Open Water	0.015 acres	non-section 10 – non-wetland
Pond#3	37.152294	84.582905	Open Water	0.332 acres	non-section 10 – non-wetland

* Impacts noted are totals for Right Bank and Left Bank at various locations at bridge site.

High Gradient Stream Data Sheet

STREAM NAME: <i>PER 1</i>			LOCATION: <i>Smiths Branch</i>		
STATION:		DRAINAGE AREA (AC)	BASIN/WATERSHED <i>Cumberland River</i>		
LAT: <i>37-08-57</i>		LONG: <i>84-35-41</i>	COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;		
DATE: <i>10-28-08</i>		TIME: <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM	INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.					
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air temperature <i>37</i> °F. Inches rainfall in past 24 hours <i>0</i> in <input type="checkbox"/> <input checked="" type="checkbox"/> Intermittent showers <i>100</i> % Cloud Cover <input checked="" type="checkbox"/> <input type="checkbox"/> Clear/sunny					
P-Chem: Temp (°C) <i>6.5</i> D.O. (mg/l) % Saturation pH(S.U.) Cond.µs <i>856</i> <input type="checkbox"/> Grab					
INSTREAM WATERSHED FEATURES Stream Width EOW <i>7.0</i> ft Stream Width BF <i>15.0</i> ft Range of Depth <i>0.1-2.0</i> ft Discharge _____ cfs Est. Reach Length _____ ft			LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: Stream Flow; Stream Type; <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep <input type="checkbox"/> Other <input type="checkbox"/> Culverts					
Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <i>Black walnut</i> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Yellow buckeye</i> Number of Strata <i>3</i> <i>Dogwood</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations; <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization <input type="checkbox"/> Full <input type="checkbox"/> Partial)	
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle <i>70</i> %	Run; _____ %	Pool <i>30</i> %	
Silt/Clay (<0.06 mm)		<i>20</i>		<i>20</i>	
Sand (0.06-2 mm)					
Gravel (2-64 mm)		<i>40</i>		<i>40</i>	
Cobble (64-256 mm)		<i>40</i>		<i>40</i>	
Boulders (>256 mm)					
Bedrock					
Habitat	Condition Category				
Parameter	Optimal	Suboptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

128

NOTES/COMMENTS;

High Gradient Stream Data Sheet

High Gradient Stream Data Sheet				
STREAM NAME: <i>PER 2</i>		LOCATION: <i>Pitman Creek</i>		
STATION:	DRAINAGE AREA (AC)	BASIN/WATERSHED <i>Cumberland River</i>		
LAT: <i>37-08-54</i>	LONG: <i>84-35-41</i>	COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;		
DATE: <i>10-28-08</i> TIME: <input checked="" type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air temperature <i>37</i> °F. Inches rainfall in past 24 hours <i>0</i> in <input type="checkbox"/> <input checked="" type="checkbox"/> Intermittent showers <i>100</i> % Cloud Cover <input checked="" type="checkbox"/> Clear/sunny <input type="checkbox"/> Clear/sunny				
P-Chem: Temp (°C) <i>5.3</i> D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs <i>841</i> <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES Stream Width EOW <i>20-50</i> ft Stream Width BF <i>60.0</i> ft Range of Depth <i>0.1-3.0</i> ft Discharge _____ cfs Est. Reach Length _____ ft		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input checked="" type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Other <input type="checkbox"/> Culverts		Stream Flow; Stream Type; <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <i>Hickory</i> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Sugar maple</i> Number of Strata <i>3</i> <i>Sycamore</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%) Channel Alterations; <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization <input type="checkbox"/> Full <input type="checkbox"/> Partial		
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle <i>40</i> %	Run; _____ %	Pool <i>60</i> %
Silt/Clay (<0.06 mm)		<i>20</i>		<i>30</i>
Sand (0.06-2 mm)				<i>30</i>
Gravel (2-64 mm)		<i>40</i>		<i>20</i>
Cobble (64-256 mm)		<i>40</i>		<i>20</i>
Boulders (>256 mm)				
Bedrock				
Habitat		Condition Category		
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

126

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <i>INT 1</i>			LOCATION:		
STATION:		DRAINAGE AREA (AC)	BASIN/WATERSHED <i>Cumberland River</i>		
LAT: <i>37-08-06</i>		LONG: <i>84-37-13</i>	COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;		
DATE: <i>10-27-08</i>		TIME: <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM	INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.					
WEATHER: Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
<div style="display: flex; justify-content: space-between;"> Air temperature <i>43</i> °F. Inches rainfall in past 24 hours <i>0</i> in </div>					
<div style="display: flex; justify-content: space-between;"> Intermittent showers <input type="checkbox"/> <i>100</i> % Cloud Cover </div>					
<div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Clear/sunny </div>					
P-Chem: Temp (°C) <i>N/A</i> D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs <i>N/A</i> <input type="checkbox"/> Grab					
INSTREAM WATERSHED FEATURES Stream Width EOW <i>1.0</i> ft Stream Width BF <i>3.0</i> ft Range of Depth <i>0-0.5</i> ft Discharge _____ cfs Est. Reach Length _____ ft			LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential					
Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <i>Box elder</i> <input checked="" type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Red Maple</i> Number of Strata <i>4</i>		Dom. Tree/Shrub Taxa <i>Box elder</i> <i>Red Maple</i> <i>Rubus species</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input checked="" type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)	
Channel Alterations; <input type="checkbox"/> Dredging <input checked="" type="checkbox"/> Channelization <input checked="" type="checkbox"/> Full <input type="checkbox"/> Partial					
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C.		Riffle _____ %		Run; <i>100</i> %	
Silt/Clay (<0.06 mm)		Pool _____ %		<i>100</i>	
Sand (0.06-2 mm)					
Gravel (2-64 mm)					
Cobble (64-256 mm)					
Boulders (>256 mm)					
Bedrock					
Habitat Parameter		Condition Category			
		Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness		Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime		All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE		20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

83

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <i>INT 2</i>				LOCATION:			
STATION:		DRAINAGE AREA (AC)		BASIN/WATERSHED <i>Cumberland River</i>			
LAT: <i>37-08-39</i>		LONG: <i>84-36-06</i>		COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;			
DATE: <i>10-27-08</i>		TIME: <i> </i> : <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM		INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>			
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.							
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air temperature <i>43</i> °F. Inches rainfall in past 24 hours <i>0</i> in <input type="checkbox"/> <input type="checkbox"/> Intermittent showers <i>100</i> % Cloud Cover <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Clear/sunny							
P-Chem: Temp (°C) <i>N/A</i> D.O. (mg/l) <i> </i> % Saturation <i> </i> pH(S.U.) <i> </i> Cond.µs <i>N/A</i> <input type="checkbox"/> Grab							
INSTREAM WATERSHED FEATURES Stream Width EOW <i>2.5</i> ft Stream Width BF <i>5.0</i> ft Range of Depth <i>0-0.75</i> ft Discharge <i> </i> cfs Est. Reach Length <i> </i> ft				LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers			
Hydraulic Structures: Stream Flow; Stream Type; <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep <input type="checkbox"/> Other <input type="checkbox"/> Culverts							
Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <i>Yellow poplar</i> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Red Maple</i> Number of Strata <i>3</i>		Dom. Tree/Shrub Taxa <i>Yellow poplar</i> <i>Red Maple</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations; <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization <input type="checkbox"/> Full <input type="checkbox"/> Partial)	
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle <i>100</i> %		Run; <i> </i> %		Pool <i> </i> %	
Silt/Clay (<0.06 mm)							
Sand (0.06-2 mm)							
Gravel (2-64 mm)		<i>33</i>					
Cobble (64-256 mm)		<i>33</i>					
Boulders (>256 mm)							
Bedrock		<i>34</i>					
Habitat		Condition Category					
Parameter	Optimal	Suboptimal			Marginal		Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).			20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.		Less than 20% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11			10 9 8 7 6		5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.			Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.		Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11			10 9 8 7 6		5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)			Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)		Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11			10 9 8 7 6		5 4 3 2 1 0

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

118

NOTES/COMMENTS; Spring fed, but dry during assessment. Recently logged with cattle access to stream.

High Gradient Stream Data Sheet

STREAM NAME: <i>INT 3 - Downstream Section</i>			LOCATION:		
STATION:		DRAINAGE AREA (AC)	BASIN/WATERSHED <i>Cumberland River</i>		
LAT: <i>37-08-42</i>		LONG: <i>84-35-49</i>		COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;	
DATE: <i>10-27-08</i>		TIME: <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM		INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>	
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.					
WEATHER: Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny Has there been a heavy rain in the last 7 days? Air temperature <i>43</i> °F. Inches rainfall in past 24 hours <i>0</i> in <i>100</i> % Cloud Cover					

P-Chem: Temp (°C) <i>N/A</i>	D.O. (mg/l) _____	% Saturation _____	pH(S.U.) _____	Cond.µs <i>N/A</i>	<input type="checkbox"/> Grab
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INSTREAM WATERSHED FEATURES Stream Width EOW <i>1.5</i> ft Stream Width BF <i>4.0</i> ft Range of Depth <i>0-1.5</i> ft Discharge _____ cfs Est. Reach Length _____ ft		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers	
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Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		Stream Flow; <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep	
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Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <i>Honeysuckle</i> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Yellow buckeye</i> Number of Strata <i>2</i> <i>Sycamore</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations; <input type="checkbox"/> Dredging <input checked="" type="checkbox"/> Channelization <input type="checkbox"/> Full <input checked="" type="checkbox"/> Partial	
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Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C	Riffle <i>33</i> %	Run; <i>34</i> %	Pool <i>33</i> %
Silt/Clay (<0.06 mm)	<i>40</i>	<i>40</i>	<i>40</i>
Sand (0.06-2 mm)			
Gravel (2-64 mm)	<i>40</i>	<i>40</i>	<i>40</i>
Cobble (64-256 mm)	<i>20</i>	<i>20</i>	<i>20</i>
Boulders (>256 mm)			
Bedrock			

Habitat	Condition Category			
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

96

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <i>INT 3 - Upstream Section</i>				LOCATION:			
STATION:		DRAINAGE AREA (AC)		BASIN/WATERSHED <i>Cumberland River</i>			
LAT: <i>37-08-41</i>		LONG: <i>84-36-04</i>		COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;			
DATE: <i>10-27-08</i>		TIME: <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM		INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>			
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.							
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air temperature <i>43</i> °F. Inches rainfall in past 24 hours <i>0</i> in <input type="checkbox"/> <input type="checkbox"/> Intermittent showers <i>100</i> % Cloud Cover <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Clear/sunny							
P-Chem: Temp (°C) <i>N/A</i> D.O. (mg/l) % Saturation pH(S.U.) Cond.µs <i>N/A</i> <input type="checkbox"/> Grab							
INSTREAM WATERSHED FEATURES Stream Width EOW <i>6.0</i> ft Stream Width BF <i>8.0</i> ft Range of Depth <i>0-1.0</i> ft Discharge _____ cfs Est. Reach Length _____ ft				LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers			
Hydraulic Structures: Stream Flow; Stream Type; <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep <input type="checkbox"/> Other <input type="checkbox"/> Culverts							
Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <i>Hackberry</i> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous <i>Redbud</i> Number of Strata <i>3</i> <i>Sycamore</i>		Dom. Tree/Shrub Taxa <i>Hackberry</i> <i>Redbud</i> <i>Sycamore</i>		Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations; <input type="checkbox"/> Dredging <input checked="" type="checkbox"/> Channelization <input type="checkbox"/> Full <input checked="" type="checkbox"/> Partial	
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle <i>90</i> %		Run; _____ %		Pool <i>10</i> %	
Silt/Clay (<0.06 mm)							
Sand (0.06-2 mm)							
Gravel (2-64 mm)		<i>33</i>				<i>33</i>	
Cobble (64-256 mm)		<i>33</i>				<i>33</i>	
Boulders (>256 mm)						<i>33</i>	
Bedrock		<i>34</i>				<i>34</i>	
Habitat		Condition Category					
Parameter		Optimal		Suboptimal		Marginal	
						Poor	
1. Epifaunal Substrate/ Available Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient.		40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).		20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	
SCORE		20 19 18 17 16		15 14 13 12 11		10 9 8 7 6	
2. Embeddedness		Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.		Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.		Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	
SCORE		20 19 18 17 16		15 14 13 12 11		10 9 8 7 6	
3. Velocity/Depth Regime		All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.		Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)		Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	
SCORE		20 19 18 17 16		15 14 13 12 11		10 9 8 7 6	
						5 4 3 2 1 0	

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

129

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <i>INT 4</i>			LOCATION:		
STATION:		DRAINAGE AREA (AC)	BASIN/WATERSHED <i>Cumberland River</i>		
LAT: <i>37-09-06</i>		LONG: <i>84-35-25</i>		COUNTY; <i>Pulaski</i> USGS 7.5 TOPO;	
DATE: <i>10-28-08</i>		TIME: <input type="checkbox"/> AM <input checked="" type="checkbox"/> PM		INVESTIGATORS; <i>Rob Lewis, Julie Clark</i>	
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.					
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air temperature <i>45</i> °F. Inches rainfall in past 24 hours <i>0</i> in <input type="checkbox"/> <input checked="" type="checkbox"/> Intermittent showers <i>50</i> % Cloud Cover <input checked="" type="checkbox"/> <input type="checkbox"/> Clear/sunny					
P-Chem: Temp (°C) <i>10.3</i> D.O. (mg/l) % Saturation pH(S.U.) Cond.µs <i>337</i> <input type="checkbox"/> Grab					

INSTREAM WATERSHED FEATURES Stream Width EOW <i>3.0</i> ft Stream Width BF <i>5.0</i> ft Range of Depth <i>0-1.0</i> ft Discharge _____ cfs Est. Reach Length _____ ft	LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Surface Mining <input type="checkbox"/> Deep Mining <input type="checkbox"/> Oil Wells <input type="checkbox"/> Land Disposal </div> <div> <input type="checkbox"/> Construction <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Row Crops </div> <div> <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff/Storm Sewers </div> </div>
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Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other <input type="checkbox"/> Culverts	Stream Flow; <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential	Stream Type; <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep
--	--	--

Riparian Vegetation: Dominate Type: <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Number of Strata <i>3</i>	Dom. Tree/Shrub Taxa <i>Hickory</i> <i>Sugar maple</i> <i>Buckeye</i>	Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input checked="" type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)
Channel Alterations; <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization <input type="checkbox"/> Full <input type="checkbox"/> Partial		

Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C. Riffle <i>100</i> % Run; _____ % Pool _____ %	Silt/Clay (<0.06 mm) <i>25</i> Sand (0.06-2 mm) <i>25</i> Gravel (2-64 mm) <i>25</i> Cobble (64-256 mm) <i>25</i> Boulders (>256 mm) Bedrock	
---	---	--

Habitat	Condition Category			
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

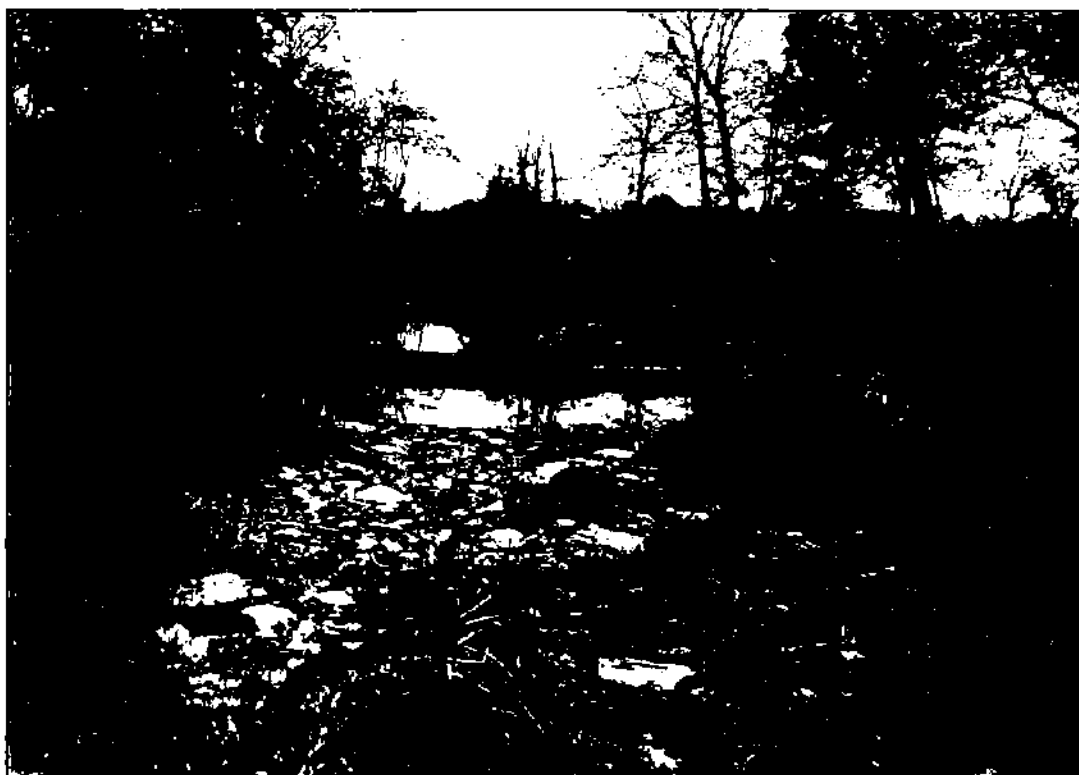
Total Score

124

NOTES/COMMENTS;



PER #1 (Smiths Branch) – Looking downstream near confluence with Pitman Creek



PER #2 (Pitman Creek) – Looking downstream near proposed bridge site.



INT #1 – Looking downstream near new Campground Road location.



INT #2 – Looking downstream.



INT #3DS – Looking upstream near proposed Nelson Valley Road location.



INT #3DS – Looking downstream near proposed Nelson Valley Road location.



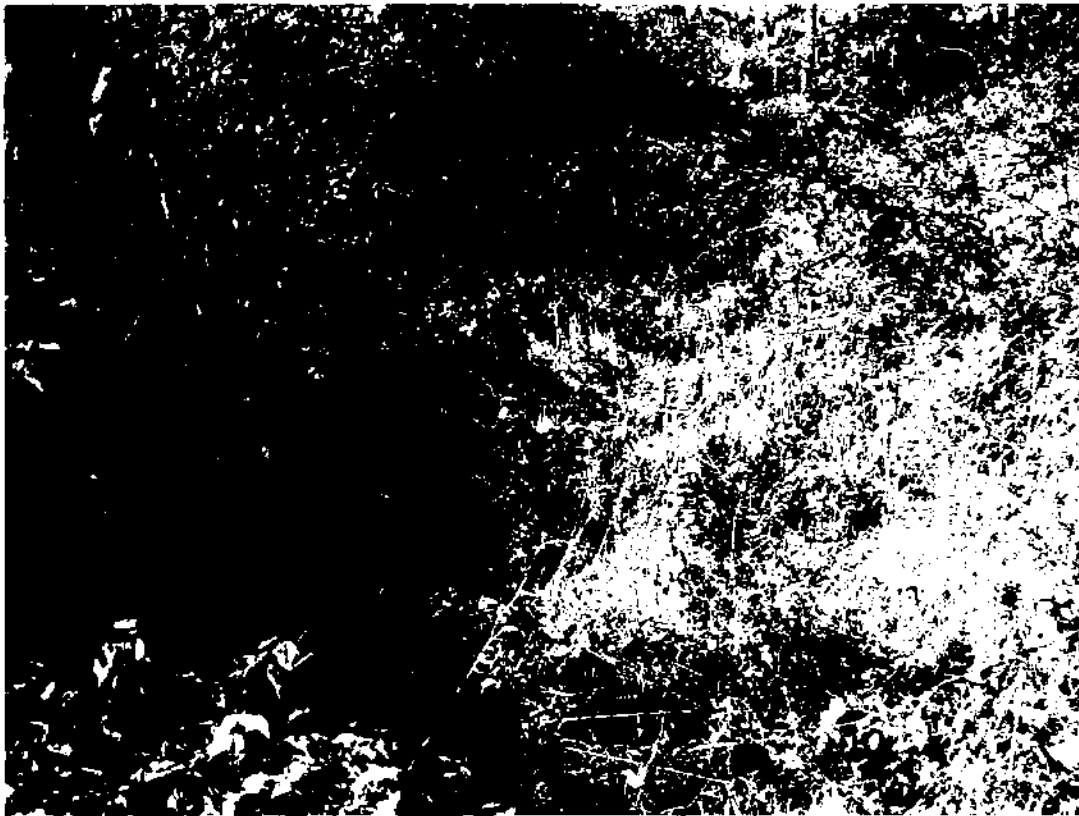
INT #3US – Looking downstream in the middle of proposed impact area.



INT #3US – Looking upstream in the middle of proposed impact area.



INT #4 – Looking upstream.



INT #4 – Looking downstream.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

3761 GEORGETOWN ROAD

FRANKFORT, KY 40601

September 16, 2007

Mr. David Waldner
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40622

Re: FWS Log 2007-B-0773 Habitat Assessment (HA) and Effects Determination for Indiana bat in association with proposed waste areas for the Northern Somerset Bypass
Pulaski County, Kentucky; KYTC Item No. 8-59.3, .5, .6

Dear Mr. Waldner:

The U.S. Fish and Wildlife Service (USFWS) has reviewed your letter received July 30, 2007 and effects determination in association with the above referenced proposed project. Based on our review of the information received:

✓ We concur with your determination that the proposed action is "not likely to adversely affect" the federally listed Indiana bat. Our concurrence regarding the Indiana bat is based upon KYTC's commitment to conduct hardwood tree cutting between October 15 and March 31. In view of this, we believe that the requirements of section 7 of the Act have been fulfilled with regards to potential affects of the proposed project on this species.

If you should have any questions, please contact Phil DeGarmo at (502) 695-0468, and please reference the above FWS Log No.

Sincerely,

Virgil Lee Andrews, Jr.
State Field Office Supervisor
Kentucky Ecological Services Field Office



United States Department of the Interior
FISH AND WILDLIFE SERVICE
3761 GEORGETOWN ROAD
FRANKFORT, KY 40601

TRANSPORTATION CABINET
ENVIRONMENTAL ANALYSIS
NOV 15 10 15 AM '03

November 13, 2003

Mr. David Waldner
Division of Environmental Analysis
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, Kentucky 40622

Subject: FWS #04-0130; Biological Assessment for the Indiana bat, gray bat, and little-winged pearlymussel, Pulaski County, Kentucky
KTC Item No. 08-0059.20

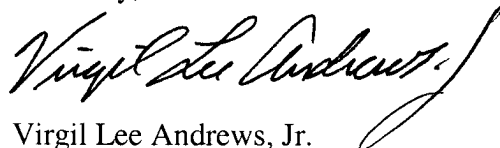
Dear Mr. Waldner:

Thank you for your letter and enclosures of September 24, 2003, transmitting a biological assessment (BA) for the federally endangered Indiana bat, gray bat and little-winged pearlymussel in association with the construction of the Somerset North Bypass in Pulaski County, Kentucky. Fish and Wildlife Service (Service) biologists have reviewed the document, and we offer the following comments.

According to the BA, field surveys for the project were conducted in August 2003. No federally endangered bats were captured during mist net surveys, and no specimens of the little-winged pearlymussel were found during the survey of Pitman Creek. Based on our knowledge of the information submitted, the Service concurs that the proposed project is "not likely to adversely affect" the federally endangered gray bat, Indiana bat, and little-winged pearlymussel. In view of this, we believe that the requirements of section 7 of the Endangered Species Act have been fulfilled for this project. Your obligations under section 7 must be reconsidered, however, if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

If you have any questions or if we can be of further assistance, please contact Mindi Brady at (502)/695-0468 (ext.229).

Sincerely,



Virgil Lee Andrews, Jr.
Field Supervisor



U.S. Fish & Wildlife Service
Kentucky Ecological Services Field Office

U.S. Fish & Wildlife Service
3761 Georgetown Rd.
Frankfort, KY 40601
Phone: 502-695-0468
Fax: 502-695-1024

Endangered, Threatened, & Candidate
Species in PULASKI County, KY

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	<i>Myotis grisescens</i>	gray bat	E	K	
	<i>Myotis sodalis</i>	Indiana bat	E	K	
Mussels	<i>Epioblasma o. obliquata</i>	purple catspaw pearlymussel	E	K	
	<i>Villosa trabilis</i>	Cumberland bean pearlymussel	E	K	
	<i>Alasmodonta atropurpurea</i>	Cumberland elktoe	E	K	
	<i>Epioblasma brevidens</i>	Cumberlandian combshell	E, CH	K	Critical Habitat designation in 2004: Buck Creek, Pulaski County (36 RM, KY 192 bridge upstream to the KY 328 bridge)(69 Federal Register 53136-53180, Aug. 2004).
	<i>Ptychobranthus subtentum</i>	fluted kidneyshell	C	K	
	<i>Pegias fabula</i>	littlewing pearlymussel	E	K	
	<i>Epioblasma capsaeiformis</i>	oyster mussel	E, CH	K	Critical Habitat designation in 2004: Buck Creek, Pulaski County (36 RM, KY 192 bridge upstream to the KY 328 bridge)(69 Federal Register 53136-53180, Aug. 2004).
	<i>Obovaria retusa</i>	ring pink	E	K	
	<i>Pleurobema plenum</i>	rough pigtoe	E	K	
Plants	<i>Cyprogenia stegaria</i>	fanshell	E	P	
	<i>Spiraea virginiana</i>	Virginia spiraea	T	K	
	<i>Platanthera integrilabia</i>	white-fringeless orchid	C	K	
	<i>Helianthus eggertii</i>	Eggert's sunflower	T	P	



U.S. Fish & Wildlife Service
Kentucky Ecological Services Field Office

U.S. Fish & Wildlife Service
3761 Georgetown Rd.
Frankfort, KY 40601
Phone: 502-695-0468
Fax: 502-695-1024

Endangered, Threatened, & Candidate

Species in PULASKI County, KY

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Fishes	<i>Phoxinus cumberlandensis</i>	blackside dace	T	K	

NOTES:

* Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.



Education, Arts and Humanities Cabinet

Nov 22 2 23 PM '02

KENTUCKY HERITAGE COUNCIL

The State Historic Preservation Office

Paul E. Patton
Governor
Marlene M. Helm
Cabinet Secretary

David L. Morgan
Executive Director and
SHPO

November 12, 2002

Mr. David M. Waldner, Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, KY 40622

**Re: Somerset Northern Bypass Project; Assessment of Appropriate Boundaries
for Site 78 (Cumberland House), Pulaski County, Kentucky. (Item No. 8-59.2)**

Dear Mr. Waldner:

The State Historic Preservation Office has received for review and approval the boundary assessment for Site 78 identified within the above referenced project's Cultural Historic Survey. We concur that the house and portions of the surrounding yard will serve as an appropriate boundary. The significance of this resource is tied to its vernacular style (a very good, intact example of the Cumberland house form) and excludes larger land areas. Should you have any questions regarding these comments, please do not hesitate to contact Tom Sanders or Craig Potts of my staff at (502) 564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

TRANSPORTATION CABINET
DIVISION OF
ENVIRONMENTAL ANALYSIS



FEB 23 3 05 PM '05

ERNIE FLETCHER
GOVERNOR

COMMERCE CABINET

KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
(502) 564-7005 (502) 564-5820 FAX
www.kentucky.gov

W. JAMES HOST
SECRETARY

DAVID L. MORGAN
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

February 23, 2005

Mr. David M. Waldner, P.E., Director
Division of Environmental Analysis
Transportation Cabinet
125 Holmes Street
Frankfort, Kentucky 40622

Re: "Phase II Archaeological Assessment of Site 15Pu432, Pulaski County, Kentucky (Item No. 8-59.20)" By Ryan J. Peterson

Dear Mr. Waldner:

The State Historic Preservation Office has received for review the above referenced archaeological report. Based on the results of his study the author concluded that archaeological site 15Pu432 is not eligible for listing in the National Register of Historic Places and warrants no further work. I concur with the author's findings. My concurrence is conditional upon the deficiencies identified in your letter being addressed and a revised report submitted in 30 days that conforms to the Kentucky Heritage Council's Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports.

We have no objections to construction proceeding within the site boundaries of archaeological site 15Pu432 and we look forward to reviewing and commenting on the Phase II investigations conducted at archaeological sites 15Pu446, 15Pu449, and 15Pu450.

Should you have any questions, feel free to contact David Pollack of my staff at (502) 564-7005.

Sincerely,

A handwritten signature in dark ink, appearing to read "David L. Morgan".

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

TRANSPORTATION CABINET
DIVISION OF
ENVIRONMENTAL ANALYSIS



OCT 27 5 01 PM '04

ERNIE FLETCHER
GOVERNOR

COMMERCE CABINET

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W. JAMES HOST
SECRETARY

DAVID L. MORGAN
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

October 27, 2004

Mr. David M. Waldner, P.E., Director
Division of Environmental Analysis
Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40622

**Re: Utility Placement at Site 15Pu432
Somerset Northern Bypass Project
Pulaski County, Kentucky
State Item Number 8-59.20**

Dear Mr. Waldner:

Thank you for your letter concerning the placement of two utility poles within the boundaries of archaeological site 15Pu432. Provided that the holes are excavated with an auger, utility vehicles do not drive across the site in wet conditions, and excavation of the auger holes is monitored by a professional archaeologist, in my opinion the proposed undertaking will not adversely impact this potentially significant archaeological site. Therefore we have no objections to the placement of two utility poles within the boundaries of archaeological site 15Pu432, prior to the completion of the evaluation of the significance of this site.

Should you have any questions, feel free to contact David Pollack of my staff at (502) 564-7005.

Sincerely,

A handwritten signature in black ink, appearing to read "David L. Morgan".

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

cc. Mary Murray
Anthony Goodman



KENTUCKY TRANSPORTATION CABINET
FRANKFORT, KENTUCKY 40622
WWW.KENTUCKY.GOV

ERNIE FLETCHER
GOVERNOR

MAXWELL C. BAILEY
SECRETARY

April 20, 2004

Mr. Greg Michaud
Johnson, Depp, and Quisenberry
6417 Cherlwood Drive
Springfield, IL 62707

SUBJECT: Request for Phase II Archaeology Scopes of Service
Somerset Northern Bypass
Sites 15Pu432, 15Pu446, 15Pu449, and 15Pu450
Pulaski County, Kentucky
State Item Number 8-59.20

Dear Mr. Michaud,

Please find the attached correspondence from the State Historic Preservation Office (SHPO) and this office concerning the above-mentioned report. The SHPO concurred with the author that sites 15Pu432, 15Pu446, 15Pu449, 15Pu450, are potentially eligible for listing in the National Register of Historic Places and recommends Phase II testing.

Please provide a scope of services and cost estimate for Phase II archaeology for review. In addition, provide a timetable when work can begin, an estimate of time to complete all fieldwork, and an estimate of time when the report will be submitted to this office for review. A summary of findings should be transmitted to this office no later than September 3, 2004.

If you have any questions or comments, please contact me or Carl Shields of my staff at (502) 564-7250.

Very truly yours,

A handwritten signature in black ink, appearing to read "David M. Waldner".

David M. Waldner, P.E., Director
Division of Environmental Analysis

DMW/crs
Enclosure
Copy with enclosures:
Paul Rawlings
Carl Shields
Dave Harmon
Hank McKelway (AMEC)
Cathi Blair (District 8)



Commerce Cabinet

KENTUCKY HERITAGE COUNCIL

The State Historic Preservation Office

Ernie Fletcher
Governor
W. James Host
Cabinet Secretary

March 24, 2004

David L. Morgan
Executive Director and
SHPO

TRANSPORTATION CABINET
DIVISION OF
ENVIRONMENTAL ANALYSIS
MAR 26 10 57 AM '04

Mr. David M. Waldner, P.E., Director
Division of Environmental Analysis
Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40622

Re: "Intensive Phase I Archaeological Investigations for the Proposed I-66 Somerset Bypass, Pulaski County, Kentucky (KYTC Item No. 8-59.20)" By Ryan Peterson

Dear Mr. Waldner:

The State Historic Preservation Office has received for review and approval the above referenced archaeological report. During the course of his survey the investigator recorded 46 archaeological sites (15Pu415-460). Based on the results of his study the author concluded that archaeological sites 15Pu415, 15Pu416, 15Pu417, 15Pu418, 15Pu419, 15Pu420, 15Pu421, 15Pu422, 15Pu425, 15Pu426, 15Pu427, 15Pu428, 15Pu429, 15Pu430, 15Pu431, 15Pu433, 15Pu434, 15Pu435, 15Pu436, 15Pu437, 15Pu439, 15Pu440, 15Pu441, 15Pu442, 15Pu443, 15Pu444, 15Pu448, 15Pu451, 15Pu452, 15Pu453, 15Pu454, 15Pu456, 15Pu457, 15Pu458, and 15Pu459 are not eligible for listing in the National Register of Historic Places and warrant no further work. He also concluded that archaeological sites 15Pu423, 15Pu424, 15Pu432, 15Pu438, 15Pu445, 15Pu446, 15Pu447, 15Pu449, 15Pu450, 15Pu455, and 15Pu460 are potentially eligible for listing in the National Register of Historic Places and warrant further work. With the exception of archaeological sites 15Pu423, 15Pu424, 15Pu438, 15Pu445, and 15Pu447, I concur with the author's findings. With respect to archaeological sites 15Pu423, 15Pu424, 15Pu438, 15Pu445, and 15Pu447 we concur with your staff that these archaeological sites are not eligible for listing in the National Register of Historic Places and warrant no further work.

It should be noted that additional work is needed at archaeological site 15Pu455 if the foundation of the house is to be impacted. It is my understanding that as currently planned, the project will not impact the foundation of the house. If this is the case then no further work would be needed at this site.

We agree with the recommendation for monitoring in the vicinity of the Sweeney cemetery to look for isolated graves associated with the cemetery. If multiple graves (i.e., more than 5) are identified, we look forward to consulting with your office on the significance of this

Page 2.

March 24, 2004

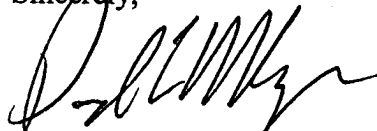
Mr. David M. Waldner

cemetery. We also concur that no additional investigations are needed of the Somerset Salvage yard.

My concurrence is conditional upon our receipt and approval of a final report that addresses the report deficiencies outlined in your letter and conforms to the Kentucky Heritage Council's Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports within 45 days.

We look forward to working with you to develop scope of works for those sites for which additional work has been recommended. Should you have any questions, feel free to contact David Pollack of my staff at (502) 564-7005.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. L. Morgan', with a stylized flourish at the end.

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

cc. George Crothers

FHWA

TRANSPORTATION CABINET
DIVISION OF
ENVIRONMENTAL ANALYSIS

MEMORANDUM OF AGREEMENT
FOR PHASE II ARCHAEOLOGICAL TESTING AND
THE COMPLETION OF PHASE I ARCHAEOLOGICAL SURVEY
SOMERSET NORTHERN BYPASS (KYTC ITEM NO. 8-59.20)
PURSUANT TO 36 CFR 800.6(a)

UNDERTAKING: Somerset Northern Bypass, Pulaski County

STATE: Kentucky

AGENCY: Federal Highway Administration

WHEREAS, the Federal Highway Administration (FHWA) has determined that the construction of Somerset Northern Bypass, Pulaski County, may have an effect upon properties included in or eligible for inclusion in the National Register of Historic Places and has consulted with the Kentucky State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f).

WHEREAS, The Kentucky Transportation Cabinet (KYTC) participated in the consultation and has been invited to concur in the Memorandum of Agreement; and

WHEREAS, the consulting parties agree that it is in the public interest to expend funds to implement the recovery of significant information from archaeological sites to mitigate the adverse effects of the future highway construction project; and

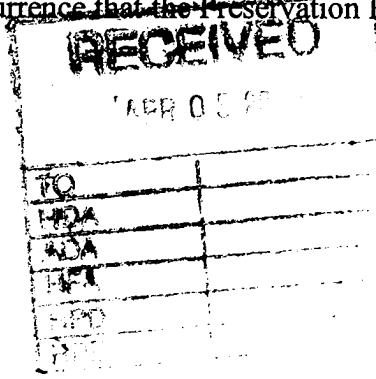
WHEREAS, the consulting parties agree that Indian Tribes that may attach religious or cultural importance to the affected property have been consulted and have raised no objection to the work proposed; and

NOW, THEREFORE, the FHWA and the Kentucky SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

Stipulations

FHWA will ensure that the following measures are carried out.

1. FHWA shall ensure that all archaeological work required by this Memorandum of Agreement will be carried out by Preservation Professionals meeting at a minimum the Secretary of the Interior's Professional Qualification Standards (48 FR 44738-9). FHWA will consult with the Kentucky SHPO for concurrence that the Preservation Professionals meet these Standards.



Phase II Archaeological Testing

2. Archaeological sites requiring Phase II testing that will be impacted by the project will be tested prior to the initiation of any construction activities to determine if it is eligible for listing in the National Register of Historic Places. Upon completion of the testing, a report will be prepared in accordance with the SHPO's most current Specifications for Archaeological Field Work and Assessment Reports and will be submitted by FHWA to the SHPO and interested Indian Tribes for review and comment.
3. If based on the testing, the SHPO determines that the site is eligible for listing in the National Register, FHWA will develop a data recovery plan in conformance with the Secretary of the Interior's Standards for Archaeology and Historic Preservation (48 FR 44716-42). The data recovery plan will be submitted to the SHPO for review and comment. Unless the SHPO comments or objects within thirty (30) days of receiving the research design and data recovery plan, FHWA shall ensure that the plan is implemented.

Phase I Archaeological Survey

4. Phase I archaeological survey will be conducted for all unsurveyed parcels resulting from adjustment in the project alignment, prior to the initiation of any construction activities, to determine if they contain archaeological sites that are eligible for listing in the National Register of Historic Places. Upon completion of the survey, a report will be prepared in accordance with the SHPO's most current Specifications for Archaeological Field Work and Assessment Reports and will be submitted by FHWA to the SHPO and interested Indian Tribes for review and comment.
5. If archaeological sites are identified and considered potentially eligible by the SHPO for listing in the National Register of Historic Places, they will be tested prior to the initiation of any construction activities to determine if they are eligible for listing in the National Register of Historic Places. Upon completion of the testing, a report will be prepared in accordance with the SHPO's most current Specifications for Archaeological Field Work and Assessment Reports and will be submitted by FHWA to the SHPO and interested Indian Tribes for review and comment.
6. If based on the testing, this site is determined by the SHPO to be eligible for listing in the National Register, FHWA will develop a data recovery plan in conformance with the Secretary of the Interior's Standards for Archaeology and Historic Preservation (48 FR 44716-42). The data recovery plan will be submitted to the SHPO for review and comment. Unless the SHPO comments or objects within thirty (30) days of receiving the data recovery plan, FHWA shall ensure that the plan is implemented.

Modification, Amendment, or Termination

Modification, amendment, or termination of this agreement as necessary shall be accomplished through mutual consent of the signatories in the same manner as the original agreement.

Dispute Resolution

Disputes regarding the completion of the terms of this agreement shall be resolved by the signatories. If the signatories cannot agree regarding a dispute, any one of the signatories may request the participation of the Advisory Council on Historic Preservation to assist in resolving the dispute.

Duration

This agreement shall be null and void if its terms are not carried out within 5 (five) years from the date of its execution, unless the signatories agree in writing to an extension for carrying out its terms.

FEDERAL HIGHWAY ADMINISTRATION

BY: Evan J Wisniewski
for Jose Sepulveda, Division Administrator

Date: 4/23/04

KENTUCKY STATE HISTORIC PRESERVATION OFFICER

BY: David L Morgan
David L. Morgan, Director

Date: 3-25-04

CONCUR

BY: Maxwell C Bailey

Date: 3-23-04

Maxwell C. Bailey, Secretary, Kentucky Transportation Cabinet

APPROVED AS TO FORM AND LEGALITY:

BY: Susan Pugh Chaplin

Date: 03/18/04

Office of General Counsel, Kentucky Transportation Cabinet